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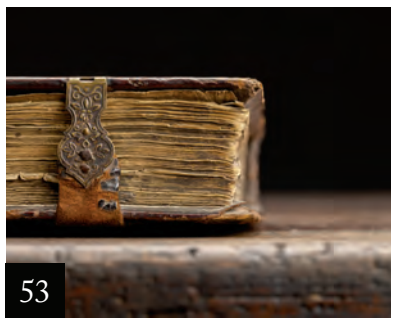
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[FROM THE EDITOR

Skepticism's Newly Recognized Relevance

Suddenly the things we skeptics have been warning about for decades—the dangers of a population unable or unwilling to discern truth from nontruth—have become a mainstream concern. Our organization was founded because of the rise of uncontested belief in paranormal wonders and pseudoscientific claims in the mid-1970s. Founder Paul Kurtz warned of the upsurge of irrationality and the dangers to society if scientists, scholars, and others didn't speak up and actively counter that misinformation. Later, our colleague Carl Sagan—in this magazine, at our conferences, and in his book *The Demon-Haunted World*—poignantly warned of the dangers of a civilization unable to tell what's real from what isn't. Some critics complained that we were overreacting. We were not, and that is now apparent. It is not a big leap to go from credulous belief in psychic powers and other-worldly visitations to ready acceptance of dangerous conspiracy theories, cult-like delusions, and outright lies that have immense political and social consequence.

Recently Jevin D. West and Carl T. Bergstrom of the University of Washington bluntly warned in the *Proceedings of the National Academy of Sciences*—one of the most respected scientific journals—that misinformation is far more dangerous to the world than most had thought: "Misinformation has reached crisis proportions. It poses a risk to international peace, interferes with democratic decision making, endangers the well-being of the planet, and threatens public health." There and in Bergstrom and West's book *Calling Bullshit*, they showed how to develop skills to counter the nonsense and call for mobilizing the science community.

In an extended commentary in this issue, "Critical Study of Nonsense Finally a Mainstream Concern," skeptic and CSI Fellow Daniel Loxton writes powerfully about all these issues. He praises the skeptic community's early warnings. He correctly notes that we have always been awash in misinformation, but, as Sagan noted, "credulous and confused thinking" can be much more lethal than before. Misinformation *matters*, Loxton emphasizes. It always has mattered, but now the "fringe" is not fringe but central to the lives of billions. "Misinformation may be the central challenge for our future as a species."

* * *

Our cover illustrates one theme of Nick Tiller's lead article about how best to counter the misinformation spread by anti-science movements. Don't just debunk their claims but "prebunk" them. One method is, in effect, to inoculate people against misinformation by exposing them in advance to weak forms of misinformation to then develop immunity to its stronger forms. That way they can more easily spot it and develop counterarguments. Tiller, a senior research fellow at UCLA's Harbor Medical Center, examines pseudoscience and misinformation. His article is a Skeptical Inquirer exclusive, but he has also recently started writing a regular column for us on our website skepticalinquirer.org.

We are grateful, as always, for the insights and contributions of our scholars and investigators from all over the world who show how best to deal with the torrents of nonsense and misinformation that threaten to overwhelm society.

—Kendrick Frazier

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Jan. 6 Investigation Testimony Reveals Conspiracy-Riddled Trump White House

Benjamin Radford

Members of the Jan. 6 committee hear testimony. Photo by MANDEL NGAN/AFP via Getty Images.

In June, the House committee investigating the January 6, 2021, insurrection at the U.S. Capitol revealed damning evidence about the role that conspiracy theories played in both the Trump administration and the then-president's efforts to overturn the 2020 election. Using both videotaped and live testimony—much of it from Republicans close to Trump—the committee laid out a sustained pressure campaign orchestrated by Trump and his allies to spread the conspiracies, as well as to abuse and harass those who rejected them.

Rusty Bowers, the Republican speaker of Arizona's House, testified about the harassment he and his family suffered due to Trump supporters who acted on the vilification he received from the former president after refusing to commit election fraud at Trump's behest:

> Up till even recently, it is the new pattern, or a pattern in our lives, to worry what will happen on Saturdays. Because we have various groups come by and they have had video panel trucks with videos of me proclaiming me to be a pedophile and a pervert and a corrupt politician and blaring loudspeakers in my neighborhood and leaving literature [attacking me].

Others who refused to endorse or accept Trump's unfounded conspiracy theories were similarly attacked and harassed; some were "doxxed," having their personal information, including phone numbers, made public. Others had protesters with bullhorns outside their homes demanding they confess to nonexistent election fraud.

Two female African American election workers in Georgia, Ruby Freeman and her daughter Wandrea Moss, were falsely implicated in an election fraud by Trump's lawyer Rudy Giuliani. Both women endured racist abuse and harassment from Trump supporters. Bowers testified that when Giuliani was asked about the basis for the election fraud conspiracies, he replied, "We've got lots of theories. We just don't have the evidence."

As *The New York Times* noted:

> Shortly after the election, Mr. Trump and his allies seized on conspiracy theories, falsely claiming that election workers in Atlanta had been caught on video quietly taking thousands of ballots from a suitcase and feeding them into counting machines. Even though the allegations were quickly investigated and debunked, Gabriel Sterling [one of Georgia's top election officials] said, Mr. Trump and his lawyers continued to push the claims in public and on social media. Fighting back against this flood of misinformation, Mr. Sterling said, was like "a shovel trying to empty the ocean."

The hearings demonstrate that Trump was told—clearly and repeatedly—by several investigators, including then-Attorney General William Barr, that the conspiracy claims he was spreading had been investigated and were determined to be false. Barr testified that Trump made bold, false conspiracy statements and had abandoned any pretense that the claims were unproven or speculative. He also did not employ his favored equivocating phrases such as "they say …" or "I'm hearing …"

Barr stated that:

> The statements were made very conclusory, like, "These machines were designed to engage in fraud," or something to that effect. But I didn't see any supporting information for it … I thought, "Boy if he really believes this stuff, he has lost contact with—he's become detached from reality, if he really believes this stuff."

Barr reiterated that he had duly researched the fraud claims and found no evidence to support them, calling Trump's conspiracy claims "bullshit," "nonsense," and "crazy stuff."

Political conspiracies are nothing new and date back millennia—the Roman Empire was rife with intrigue and plots—but Trump's endorsement of conspiracies is unprecedented in American politics. Never before have conspiracies played such a prominent role in both presidential politics and history, as the hearings reveal.

Whether Trump himself sincerely believes the conspiracies he peddles is both unknowable and moot; many of his followers continue to do so despite overwhelming and conclusive evidence to the contrary. Indeed, the election fraud conspiracy has been widely adopted; a University of Massachusetts Amherst poll on the anniversary of the

January 6 attacks found that 71 percent of Republicans believe Trump's claim that he won the 2020 election.

Representative Adam Schiff asked, "If you can convince Americans they cannot trust their own elections, that any time they lose is somehow illegitimate, then what is left but violence to determine who should govern?" Representative Liz Cheney, vice chairwoman of the committee, added:

> Donald Trump did not care about the threats of violence. He did not condemn them. He made no effort to stop them. He went forward with his fake allegations anyway. … We cannot let America become a nation of conspiracy theories and thug violence.

In testimony, White House lawyer Eric Herschmann described a contentious—described by one witness as "unhinged"—Oval Office meeting in which former Trump lawyer Sidney Powell promoted conspiracy theories about a Venezuelan plot to rig the voting machines. Powell described Trump as "very interested in hearing" her conspiracies despite an incredulous and "flabbergasted" Herschmann. He asked Powell to explain the wild theories she advocated to the president of the United States.

When Herschmann and others pointed out to Powell that her dozens of lawsuits challenging the election results had been laughed out of courts, she claimed that, too, was part of the conspiracy and that "the judges are corrupt." At this, Herschmann testified he pushed back again: "I'm like, everyone? Every single case that you've done in the country that you guys lost? Every one of them is corrupt? Even the ones we appointed?" In defending Powell from a defamation lawsuit from election machine manufacturer Dominion Voting Systems, her lawyers claimed that "no reasonable person" would think that her election conspiracy theories were truthful or factual. ■

Benjamin Radford is the deputy editor of the Skeptical Inquirer.

Great Expectations: House Hearing on UAP Excites Fans, Offers Little Else

Mick West

May 17, 2022, The House Intelligence Subcommittee on Counterterrorism and Counterintelligence held a much heralded hearing on unidentified aerial phenomena (or UAP, the new term for UFOs). Expectations were high, in no small part due to the statements of the committee members.

Adam Schiff, the chairman of the House Intelligence Committee, described it as the public's chance to "hear from experts on one of the greatest mysteries of our time." He also said, "The American people deserve full transparency." André Carson, who led the proceedings, stated ahead of time that "We can't rule out something that is otherworldly." In his introductory remarks at the hearing, he said, "UAPs are unexplained, it's true, but they are real, and many threats they pose need to be mitigated."

The UFO community was agog. It was the first congressional hearing on UFOs in fifty years! Full transparency was promised about one of the greatest mysteries of our time! It was going to be epic.

Veteran UFO fans tried to temper the excitement, having been burned before with promises of perpetually imminent "disclosure." But the people following the #ufotwitter hashtag were largely celebratory that hearings were happening at all and giddy with excitement about what might be revealed.

So, what happened?

Two witnesses spoke, both seasoned veterans of the intelligence community. First up was Ronald Moultrie, the undersecretary of defense for intelligence and security, who is responsible for the tortuously acronymed AOIMSG (Airborne Object Identification and Management Synchronization Group)—a new office set up to investigate UAP.

Moultrie opened with a discussion about process, defining UAP as "airborne objects that, when encountered, cannot be immediately identified." He described, in general terms, how the new office would "facilitate the identification of previously unknown or unidentified airborne objects in a methodical, logical and standardized manner."

Scott Bray, the deputy director of naval intelligence, spoke next. He narrowed down the scope of the discussion to a Naval perspective, describing an increase in the number of unidentified objects or aircraft in military training areas. He then explained, in a nutshell, what the likely reasons for this increase were:

> We attribute this increase in reporting to a number of factors including: our work to destigmatize reporting, an increase in the number of new systems such as quadcopters and unmanned aerial systems [drones] that are in our airspace, identification of what we can classify as clutter, mylar balloons, and other types of air trash and improvements in the capabilities of our various sensors to detect things in our airspace.

Bray talked a little about how they were putting together a team of diverse experts to look into this problem, a description that reminded me very much of the team of experts assembled by the Chilean Air Force to investigate UFOs. That team spent two years trying to figure out one UFO before failing utterly, giving up, and releasing the video as a "genuine" UFO. People online (including me) then solved the case in a few days (see https://skepticalinquirer.org/newsletter/curated-crowdsourcing-in-ufo-investigations/).

The 'Fly-By' Video

Bray then reinforced the Chilean similarity with two examples. He first

showed a video titled "FlyBy," shot from the cockpit of a Navy F/A-18. It's eight seconds long. In the last second, something is briefly visible flying past the window. They then spent a rather embarrassing five minutes attempting to freeze frame the video on the actual UFO. Bray said of this video: "There it was. In many cases, that's all that a report may include and in many other cases, we have far less than this. … This often limited amount of high quality data and reporting hampers our ability to draw firm conclusions about the nature or intent of UAP."

It was difficult to make out anything in the video shown to the committee, but they later released a higher resolution version. This showed that it was a gray object with a bright highlight—probably a reflection of the sun. It was also desperately out-of-focus, which caused the highlight to expand into a hexagonal shape—an optical effect known as "bokeh," where the shape of out-of-focus spots of light take on the shape of the camera aperture. Bokeh is a common source of accidental "orb" UFO photos. In this case, the shape of the out-of-focus highlight was consistent with being recorded on an iPhone.

Bray alluded to the highlight in describing the object as being "reflective." He also discussed the motion of the object:

> When you are moving very fast … it gives a lot of different impressions about how quickly something is or isn't moving. Sometimes things that happen very quickly, something may be moving very slow, that aircraft is moving quite fast, how fast that object is moving that goes by, is probably very slow.

So, we have an out-of-focus reflective object just floating along in the air. The simplest explanation by far is something Bray singled out in his introduction: a mylar balloon.

Why would they not mention it? It's surely the leading hypothesis. The problem here is that the video is so bad, so low-information, that it's difficult to say anything about it with confidence.

A still from the "Fly-By" video showed during the House hearing on UAP

While a mylar balloon is the most likely answer, the cautious military mind does not want to pick a definitive answer based on incomplete information or what might be seen as speculation.

However, this should not stop them from producing some kind of confidence assessment or at least some very basic analysis. I like to make simple lists of possibilities when a definitive answer is not available. By refusing to say anything at all, they open the door to wild speculation. Is it a balloon or an alien spaceship?

One (admittedly speculative) reason they might not want to say that it is a mylar balloon is national security. If mylar balloons are showing up on new radar systems as unknown targets, then information about that might be something useable by an adversary to create cheap airspace decoys.

Green Triangles

The second video was dubbed the "Green Triangle." This had been leaked from the UAP task force to UFO popularizing filmmaker Jeremy Corbell (who was rather inexplicably mentioned by Carson in his opening statement). Corbell had touted the video as the "best UFO military-filmed footage the world has ever seen."

Unfortunately, people on the internet and I had other ideas. Minutes after the video was leaked, I tweeted that the triangle shape was likely a camera artifact. Over the next few days, it was shown conclusively (to most people) that what was seen was not a pyramid but rather some out-of-focus lights from a plane or drone.

I'd gotten a lot of pushback from half the UFO community on this, so I was delighted when Bray confirmed my hypothesis, saying "the triangular appearance is a result of light passing through the night vision goggles, and then being recorded by an SLR [single-lens reflex] camera." Bray might have even been referencing the work

The "Green Triangle" video was the result of light passing through the triangular aperture of night-vision goggles.

of my fellow investigators when he said "the UAV [unmanned aerial vehicle] task force is aware of studies that have [replicated the effect]."

So how long did it take the UAP task force to figure it out? Bray went on to explain that the original video—the one that we solved in days—took "several years" to resolve. Again, this tallied with the Chilean UFO case. A supposed highly skilled multidisciplinary task force of experts, liaising with the vast resources of multiple Pentagon departments, took *years* to do what a few nerds on the internet did in days. But at least they got the right answer this time—perhaps with our help.

Introducing Mythology

The videos were the highlight for me, because they represented relatively current evidence of an ongoing situation. But for other UFO aficionados, the more interesting lines of questioning came from representative Mike Gallagher, the first of which was:

> It's also been reported that there have been UAP observed and interacting with and flying over sensitive military facilities, particularly not just ranges, but some facilities housing our strategic nuclear forces. One such incident allegedly occurred at Malmstrom Air Force Base in which 10 of our nuclear ICBMs were rendered inoperable. At the same time, a glowing red orb was observed overhead. I'm not commenting on the accuracy of this. I'm simply asking you whether you're aware of it and whether you have any comments on the accuracy of that report.

Scott Bray responded that he had heard "stories" but not official data. Gallagher seemed surprised at this. In later discussion in the UFO community, there was speculation that Bray was lying because, in the minds of part of the UFO community, the idea that UFOs were messing with our nukes had become something of an accepted fact.

What Gallagher neglected to mention was that the Malmstrom UFO incident happened *fifty-five years ago*, on March 24, 1967. Some mysterious technical glitches occurred a week before the "glowing red orb," but the army investigated at the time and found no connection to any UFO sighting. The story has remained in UFO culture largely due to the account and efforts of one eyewitness, Robert Salas. Skeptical investigators suggest the red "UFO" was probably Mars and over the decades have collated numerous issues with Salas's account (see https://www.metabunk.org/threads/salas-malmstrom.3284/).

Gallagher then went on to ask about the "Admiral Wilson memo"—an account of a supposed interview by fringe scientist Eric Davis with Vice Admiral Thomas Wilson, in which they discussed secret government programs involving crashed flying saucers and alien bodies. Again, Bray was unaware of this piece of (more recent) UFO mythology. (Wilson has denied the meeting even happened.) Gallagher asked that it be entered into the congressional record, much to the delight of UFO fans who saw this as a vindication of their belief in its authenticity.

What Does This Amount To?

Those were the highlights, but there was some more talk about process and a few other details. Other bits of mythology, such as UFO wreckage retrieval, were briefly raised and dismissed or denied. Several questions regarding sensors were deferred to the closed portion of the hearing where people hoped the real meat would emerge. But in comments from committee members afterward, nobody indicated the closed portion contained a smoking alien ray gun. They were focused more on potential security implications.

So, the much anticipated House Intelligence Subcommittee on Counterterrorism and Counterintelligence hearing amounted to two terrible videos with poor analysis, an understandable lack of knowledge about UFO mythology, and discussion about getting better at identifying things in the air. It was both disappointing and validating—but in different directions depending on your point of view.

The military seems to be proceeding in a sensible, if slow and secretive, direction. UAP, as they explicitly said, represent a variety of things. Probably some of them are mylar balloons that embarrassingly spoof the latest radar in our fighters. Some might be drones, maybe even drones from foreign adversaries. Some they can't explain simply due to lack of data. They don't seem to think aliens are anything more than an amusing hypothetical—but that doesn't stop the fans from asking about them. ■

Mick West is a science writer, skeptical investigator, and retired video game programmer. He created the websites Contrail Science and Metabunk, and he investigates and debunks pseudoscientific claims and conspiracy theories, such as chemtrails and UFOs. He is author of *Escaping the Rabbit Hole: How to Debunk Conspiracy Theories Using Facts, Logic, and Respect*. He is a CSI fellow.

Rumors on WhatsApp Lead to Mob Killings in Mexico

Benjamin Radford

On Friday, June 10, 2022, thirty-one-year-old Daniel Picazo, a lawyer and political consultant from Mexico City, was visiting his grandfather in the rural town of Las Colonias de Hidalgo, about three hours northeast of the capital. Picazo, described by his father as "intelligent and studious," had recently graduated with a master's degree and was visiting the town for a vacation. Shortly before midnight, smartphones around the town—and in the nearby indigenous community of Papatlazolco—began buzzing with urgent WhatsApp group chat messages about Picazo.

A local had noticed Picazo's out of state license plates and, for some reason, suspected he was there for sinister purposes. The anonymous, viral warnings claimed that Picazo had kidnapped an adolescent, intending to kill the child and harvest its organs. As the messages spread from phone to phone and person to person throughout the night, a mob of about 200 people gathered. They tracked Picazo down and demanded justice. Police tried to intervene and secure Picazo's safety by putting him in a patrol car away from the mob, but that just confirmed for many that he was being arrested—presumably for the child abduction or killing they'd seen described in the warning messages flooding their phones. The villagers overwhelmed the police, pulled Picazo from the car, and dragged him to a nearby field. There they tied his hands and beat him with fists and boards.

Picazo begged the mob to take out his wallet and confirm his identity—he had official identification as a member of the Mexican government's Chamber of Deputies—but they instead doused him with gasoline and set him on fire. He survived the beating and burning but succumbed to his injuries, because the crowd refused to let police and medics through to rescue him. Seven men were later arrested in connection with Picazo's lynching; it's not clear that any children in the small community were ever even missing.

Mob justice is not uncommon in many parts of Mexico, especially in rural areas subject to sporadic, lax, and often corrupt police services. In 2019, seven men were beaten and burned alive by a mob in the same region. The year before, on August 29, 2018, Ricardo Flores and his uncle Alberto Flores Morales visited San Vicente Boqueron—like Papatlazolco, in the Mexican state of Puebla—from their nearby hometown in their SUV to buy construction materials. They parked near a school and went into a local bar, arriving just as internet rumors on WhatsApp called for people to be vigilant for stranger child kidnappers in the neighborhood driving an SUV. Following a familiar pattern, villagers noticed the pair was not local and accused them of looking for children to abduct. Their pleas of innocence were ignored as a mob dragged the men into the road, tied them up, beat them, and eventually burned them alive with gasoline outside a local police station.

Such vigilante justice is of course not unique to Mexico. In October of the same year, three people in Ecuador were killed by a mob after a message circulated on WhatsApp falsely accusing them of being child kidnappers, and a man in Bogota, Colombia, was killed by a mob that suspected him of abducting children. In 2018, nearly two dozen people were killed in separate incidents across a dozen Indian states when mobs set upon suspected child abductors they'd been warned about in messages on social media; see my article "Social Media–Fueled Child Abduction Rumors Lead to Killings" in the January/February 2019 SI. According to a 2019 report titled *WhatsApp Vigilantes* published by the London School of Economics and Political Science, in India alone "rumors and subsequent allegations of child abduction have resulted in over forty deaths with a far greater number injured and traumatized."

The WhatsApp platform, owned by Facebook (now Meta Platforms), has

las estrellas
"Ahí les suplico que tengan mucho cuidado.
Hace 3 días robaron a un niño aquí en el municipio de Ocotzingo.
Voz
Audio WhatsApp

Part of a rumor warning shared on WhatsApp, reading "I beg you to be very careful. Three days ago a child was kidnapped in Ocotzingo municipality."

over two billion users around the world and allows information to be shared instantly to friends or groups. Unlike open social media platforms such as Facebook and Twitter, the app shares private chats; identifying who first shared the information or started a rumor is difficult or impossible because of the app's end-to-end encryption. Even WhatsApp employees cannot open or read a message unless it's specifically flagged for review by a user. The platform has been implicated in spreading a wide range of misinformation around the world, ranging from anti-vaccine messages to politically motivated hoaxes. But the child abduction rumors are among the most potentially deadly. Despite perfunctory information campaigns from WhatsApp chiding its users to beware fake news and misinformation, the rumors continue.

Child abduction rumors are part of many conspiracy theories, including the anti-Semitic Blood Libel myth, the Satanic Panic, QAnon, Wayfair rumors, and the infamous Comet Pong "Pizzagate" incident in 2016 (for more on organ theft rumors, including the harm they cause, see my article "Bitter Harvest: The Organ-Snatching Urban Legends" in the May/June 1999 SI). In the United States, false rumors of roving bands of abductors using plastic zip ties to identify their victims circulated on social media since around 2018 and recently surged in popularity. In many cases, American minorities (especially African Americans and Muslims) have been falsely accused of abductions based on social media rumors, making it a social justice issue as well.

Most people who share viral messages warning of danger (and especially child abductions) are doing so with good intentions, sincerely thinking that they may save someone's life merely by liking and sharing. Even if they don't fully believe the story, they often adopt a "better safe than sorry" approach, assuming—wrongly—that no harm could come of it. ■

Belgian Skeptics Group Wins Defamation Lawsuit

Kendrick Frazier

CARL VAN DE VELDE
BUSINESS COACHING
MEER INFO
BUSINESS EVENTS
Strategisch ondernemen
Marketing met impact
Productief personeelsbeleid
Ontwikkel je ware potentieel
Succesvolle verkooptechnieken
ONTDEK MEER
Hier vind je een duidelijk overzicht
BUSINESS CHECK-UP 2022
GRATIS
Aan de hand van enkele doelgerichte vragen sta je stil bij verschillende aspecten van je onderneming en jezelf als ondernemer.
Je ontvangt advies op maat dat je in staat stelt om zakelijk te groeien.
DOE DE CHECK-UP

Website for Carl Van de Velde's Training Institute, which sued Belgian skeptics and lost

In a result that consumed considerable time and resources, the Belgian skeptics group SKEPP has finally won in a defamation lawsuit against it by a Belgian multimillionaire who runs the Carl Van de Velde Training Institute (CVDVTI), which SKEPP has said uses dubious theories in marketing its human resource classes.

"It has taken some time, but the Appeals Court in Belgium judged that free speech and well-founded criticism are more important than the perceived wrongs of the commercial organization being criticized," said Paul De Belder, president of SKEPP, in announcing the court decision on March 7, 2022. "The claim of our adversaries was soundly rejected by the court."

De Belder said the plaintiff has been ordered to pay €8,400 ($9,500 USD) compensation to SKEPP for its legal costs—a standard amount in court cases but low compared to its actual costs: "Our legal costs amount over 67,000 euro [$75,000] … and we expect one more invoice from our lawyers."

"On the positive side, we have received a lot of help through our fundraiser, which brought in about €46,000 [$52,000]." De Belder says about half of that was contributed by members and supporters in Belgium and the Netherlands. The other half came from skeptics and organizations in Germany, Australia (including "the generous Mr. Dick Smith"), Canada, the United States, New Zealand, and elsewhere.

"Thank you so much for your support," De Belder said. "If ever one of your organizations gets in trouble, we will stand by you."

The Belgian authors, Patrick Vermeren and Bart Van de Venare, had written an article criticizing the Carl Van de Velde Training Institute's use of theories such as NLP (neurolinguistic programming) and the characterization of people based on their skull (phrenology) and physiognomy (interpretation of outward appearances, in this case face and hair). They referred to the content as "pseudoscientific" and "marketing tricks."

Carl Van de Velde, who heads the company, sued for defamation, asking for damages of €400,000 ($473,000), even though his company showed a profit of 2.4 million euros—a million more than the year before.

"In our opinion, the action was intended to have a chilling effect on skeptics," SKEPP wrote in a news article about the lawsuit we published at the time in SI (January/February 2021, 8). They appealed to the international skeptical community for support.

Said SKEPP author Vermeren in a narrative report titled "Betrayal and Justice" published online after the court decision:

> [The court ruling of twenty-two pages] confirmed the ruling of the first court and emphasized that the freedom of speech and opinion clearly outweighed the potential damage to the reputation of Van de Velde and his training institute.
>
> … Because of the context of our article, the treated subject, our capacity as authors, the content, and the form of the publication, the court judged that the claims of CVDVTI were not proportional and not necessary. First, the court argued that our article clearly reflects our personal opinion. Second, because the press had already written about CVDVTI and Talent Tester, and because the article treated a subject "of common interest" we made no mistake there either. … Third, the court confirmed that we conducted our research very thoroughly. In my view, the CVDVTI's only aim was to silence us and nip criticism in the bud. To our regret, the courts failed to condemn the chilling effect that was intended by CVDVTI.

At least one professor already expressed his disappointment that the Courts did not condemn CVDVTI for a SLAPP lawsuit or procedural abuse (in Belgium this is called provocative and reckless litigation in a court of law). He thinks that the bar is too low in Belgian courts.

"I thank everyone who contributed to our mental and financial support," said Vermeren. "If there is one lesson to be learned, it is that united, we can stand up to people or companies with even the deepest pockets." ■

Kendrick Frazier is the editor of the Skeptical Inquirer.

'I'm Not Superstitious, but I Am a Little Stitious': Even Skeptics Cross Their Fingers

Julia Lavarnway

Just in time for 2022's solitary Friday the 13th, YouGov released their poll "Luck and Superstitions" on May 2. The poll, conducted April 26–30, 2022, asked 1,000 people from YouGov's opt-in panel for their beliefs and attitudes regarding superstitions. The good news is that a majority, 56 percent, answered no to the question "Is there anything that you are superstitious about?" Additionally, 64 percent never carry a lucky charm.

For those who are superstitious, the poll found that more of them believe in "good luck" superstitions than "bad luck" superstitions. When it comes to lucky occurrences, the highest percentage of "yes" responses involved making a wish while blowing out birthday candles and seeing a shooting star, each of which garnered 28 percent. These were followed closely by people who believe saying "bless you" when someone sneezes (27 percent)[1] and seeing a rainbow (26 percent) bring good luck. In contrast, the highest percentage for bad luck occurrences was a three-way tie of 21 percent each for walking under a ladder, breaking a mirror, and the number 666.

This got me thinking: What about the people who *do not* believe in superstitions but act them out anyway? For instance, I have worked for Skeptical Inquirer for sixteen years and consider myself a pretty diehard skeptic, but I have been known to "knock on wood"

or proclaim, "It's 11:11! Make a wish!" from time to time. I did a little digging and found a 2016 article by Jane Risen ("Believing What We Do Not Believe: Acquiescence to Superstitious Beliefs and Other Powerful Intuitions," *Psychological Review*, 123(2): 182–207) in which she explains the mechanism behind people acting out superstitions they don't believe in.

The dual process model in psychology posits that there are two different ways that thought arises: the knee-jerk unconscious process and the controlled, conscious process.

Risen starts by explaining the dual process model in psychology. Basically, the model posits that there are two different ways that thought arises: the knee-jerk unconscious process known as System 1 and the controlled, conscious process of System 2. Daniel Kahneman further interpreted this model in his 2011 book *Thinking, Fast and Slow*. As his title suggests, he defined System 1 as fast, automatic, and strongly dependent on emotion; System 2, on the other hand, is slow and subject to conscious judgments.

Risen looked into how in the dual process model "System 1 … generate[s] magical intuitions and features of the person or situation that prompt[s] System 2 to correct them." However, Risen believes that in light of non-superstitious people engaging in seemingly superstitious ritual, the dual process model needs to be refined:

> It must allow for the possibility that people can recognize—in the moment—that their belief does not make sense [System 2], but act on it nevertheless [System 1]. People can detect an error, but choose not to correct it, a process I refer to as acquiescence. … [I] suggest that we can improve the model by decoupling the detection of errors from their correction and recognizing acquiescence as a possible System 2 response.

In other words, it is the opposite of the traditional dual process model in which System 2 is thought to correct the knee-jerk System 1 response. In Risen's model, the System 2 thought is the correct one—the superstition will not have an effect—and it is System 1 that fails to fall in line with this thought; the person still acts out the superstition.

I reached out to CFI Fellow and psychologist Stuart Vyse, SI's "Behavior & Belief" columnist, for comment on this superstition business. Vyse wrote the book on the subject—literally. His *Believing in Magic: The Psychology of Superstition* won the William James Book Award of the American Psychological Association. "In our daily lives, we are often of two minds. We know we shouldn't have a second helping of chocolate cake, but we do it anyway," Vyse explained. "For many who have an inclination to be superstitious, there is a similar kind of acquiescence. The rational part of their brains knows what makes sense, but their emotional and intuitive brain says, 'I don't want to take a chance. I'll just feel better if I walk around this ladder.'"

So the next time you delight in finding a penny heads up or blow on a pair of dice at the craps table, you'll have a little more insight into why. ■

Note

1. There is an argument to be made that saying "bless you" is no longer really a superstition but rather a cultural custom that people engage in simply to be socially decorous. In this view, the ritual is not performed out of superstition but rather out of courtesy. Regardless, the YouGov poll made no such distinction.

Julia Lavarnway is the managing editor of the Skeptical Inquirer.

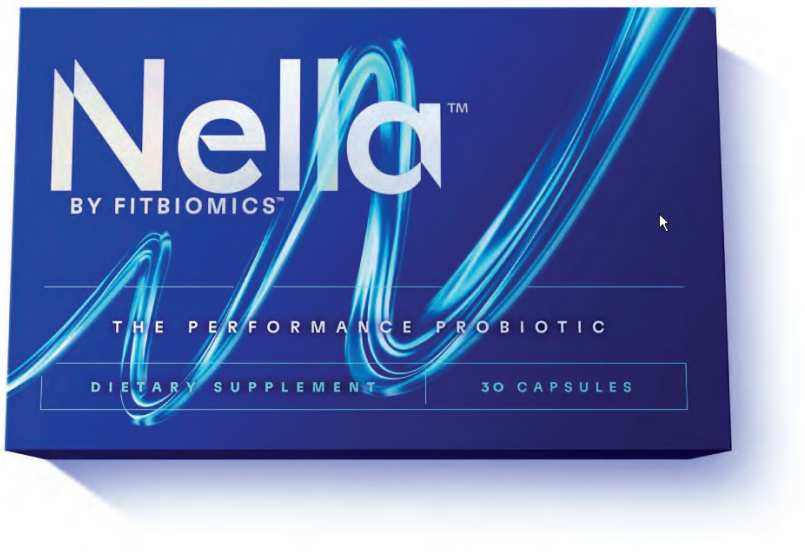
New Fitness 'Poop Pill' Promises Olympic-Level Results

Nicole Scott

There's a new product supposedly meant to aid in fitness: the Nella probiotic supplement. Probiotic supplements are not anything new to the market, but this one has a unique angle: it contains bacteria found in the bowel movements of super-athletes. Yes, you read that correctly. The pills contain poop bacteria.

Nella is manufactured by FitBiomics, a company run and founded by the inventor of this "magic" pill. Jonathan Scheiman, who earned his PhD in biomedical science from New York University, spent years researching the human microbiome and its impact on a person's overall health. His research took him to athletes and what sets them apart from the average person. Scheiman spent weeks collecting stool samples from fifteen Boston Marathon runners and found something common in the samples: high levels of the bacterium *Veillonella atypica*. If you aren't aware, anyone can run in the Boston Marathon by paying a $205 entry fee, so not everyone running would be considered a "super-athlete."

"It was a lightbulb moment," Schei-



man said in a *New York Post* article. "That metabolite is associated with fatigue, and this organism converts it into something beneficial." His team at Wyss Institute for Biologically Inspired Engineering at Harvard saw results in laboratory testing on rats running on treadmills. After this finding, Scheiman founded his company in 2018 and set forth creating the supplement. The company recruited subjects for beta test trials on the new supplement, but according to FitBiomics's own blog, the results are based on self-reporting by the participants. Now, FitBiomics has several athletes promoting the Nella supplement.

The FitBiomics website has an entire page dedicated to Nella (https://nella.fitbiomics.com/), describing it as "A daily capsule of next-gen performance probiotic supplement designed to propel you to your highest potential." Also on the website are testimonials from athletes taking the supplement and a blog dedicated to improving your gut health. But is this supplement scientifically sound?

I asked SI Deputy Editor Benjamin Radford, who has an MEd degree in science and the public, for his thoughts. His short answer was no. None of FitBiomics's research has been published by peer-reviewed journals, and their beta test lacked many traditional methods in scientific experiments: no control group, no taking placebo effects or demand characteristics into account, and an introduction of attrition bias and detection bias. The supplement is also not approved by the FDA.

Luckily though, some skeptics have spoken out. Dr. William W. Li, a world-renowned physician, scientist, speaker, and author of *Eat to Beat Disease*, recognizes how gut health can affect a person's overall health, but he also warns that much research has yet to be done on how the microbiome impacts physical performance. "Most [probiotic supplements] are safe to take, and many people report feeling better with fewer intestinal symptoms after taking them," he told the *New York Post*. "But, for the most part, improving overall health with probiotics is a marketing statement still waiting for research to support it."

So for a monthly subscription of just $59.95, you too can hijack your average GI system with bacteria until it resembles a professional athlete's—or at least a marathon runner's—microbiome. All you need to do is ingest someone else's poop bacteria. ■

Nicole Scott is assistant editor for SKEPTICAL INQUIRER and managing editor of *Free Inquiry*.

Griffith Observatory Premiers *Signs of Life* Documentary

JAMES UNDERDOWN

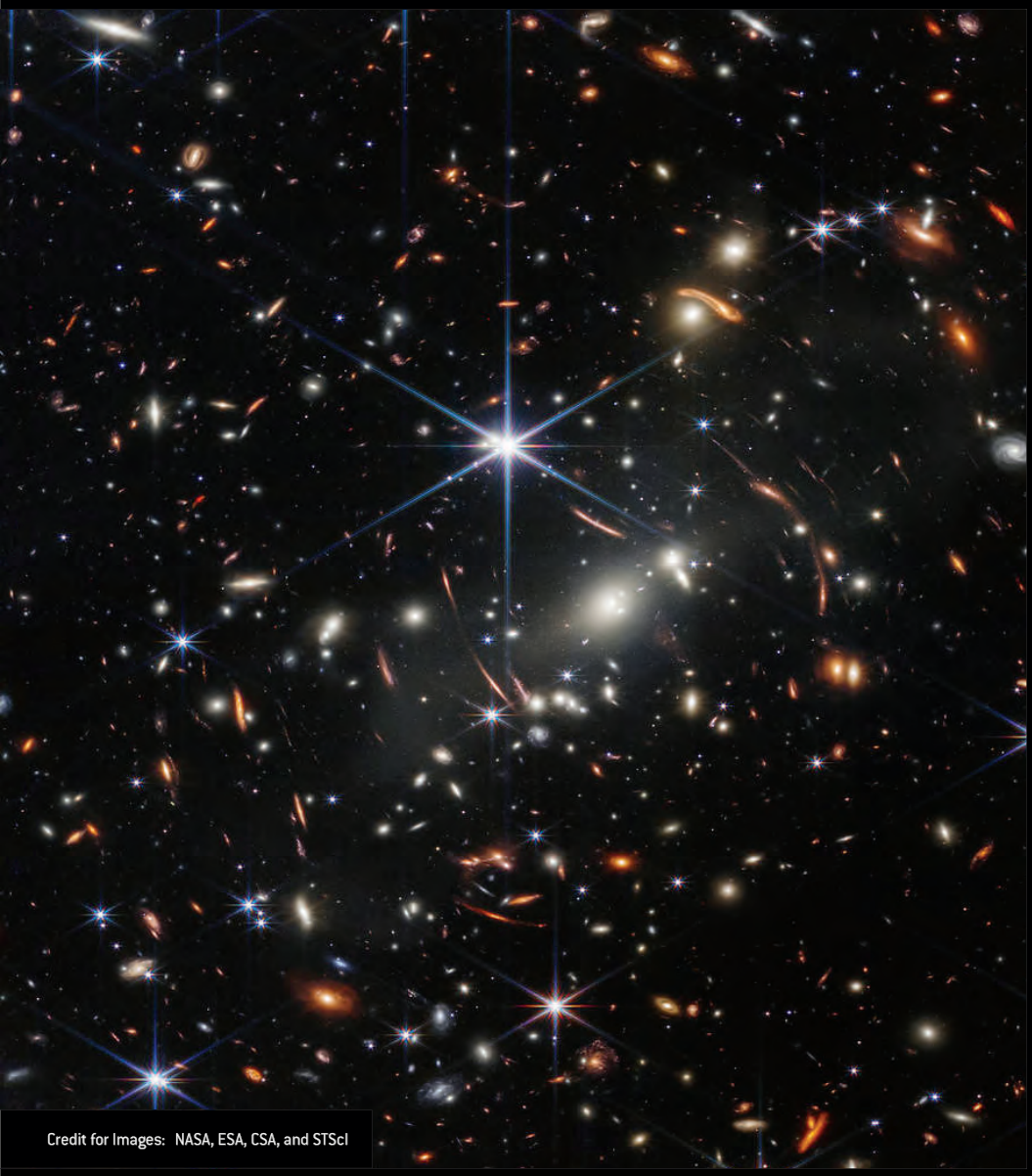
The Griffith Observatory in Los Angeles premiered its latest planetarium show, *Signs of Life*, on May 20, 2022. Some ten years in the making, *Signs of Life* employs high-tech filmmaking and is projected onto the Samuel Oschin Planetarium's seventy-five-foot dome above 290 seats. The impressive Zeiss Universarium Mark IX star projector brings wonder-filled clarity to this art-meets-science primer on the search for extraterrestrial life in the known universe. The narration/storytelling is a live performance each show.

SI readers will be happy to know that one of the underlying themes of this presentation is that life is inevitable—not just on Earth but elsewhere in our universe. Indeed, the film carries us to Mars, the moons of Jupiter and Saturn, and even outside our galaxy to explore possible homes for life away from Earth. If you find your pro-science self in the Los Angeles area, this is a must see. More information can be found at https://griffithobservatory.org/exhibits/samuel-oschin-planetarium/. ■

James Underdown is executive director of the Center for Inquiry West.

First James Webb Space Telescope Images

Far-field Galaxy Cluster and Most Distant Galaxies, New 'Star Birth,' Stephan's Quintet



Credit for Images: NASA, ESA, CSA, and STScI

After decades of planning and development and its launch on Christmas Day 2021, NASA's James Webb Space Telescope produced its first full-color scientific image (above left), issued by President Joe Biden and NASA at a late-afternoon White House briefing on July 11, 2022. "Today is a historic day," Biden noted. It is the sharpest and deepest infrared image of the distant universe to date. Webb's image is of a tiny speck of sky equivalent in width to a grain of sand held at arm's length. It shows thousands of galaxies in this tiny sliver of the universe.

The image shows the galaxy cluster SMACS 0723 as it appeared 4.6 billion years ago. The combined mass of this galaxy cluster acts as a gravitational lens, magnifying much more distant galaxies behind it. We are seeing *them* as they were nearly 13 billion years ago, not long after the big bang. Webb's near-infrared camera brought those distant galaxies into sharp focus—they have tiny, faint structures that have never been seen before, including star clusters and diffuse features.

NASA issued several other JWST images on July 12, including the "Star Birth" region NGC 3324 in Carina Nebula (upper-right), looking like a landscape of mountains and valleys speckled with glittering stars. In infrared light, it shows stars and details not visible in the previous Hubble images of the same area. Another was Stephan's Quintet, a visual grouping of five galaxies, four of them interacting, revealing sparkling clusters of millions of young stars and starburst regions of fresh star birth.

Webb is the successor to the highly successful Hubble Space Telescope, which has been producing dramatic images of the cosmos for the past quarter century. Webb is now the most powerful space telescope ever built and the world's premier space science observatory.

Critical Study of Nonsense Finally a Mainstream Concern

DANIEL LOXTON

Editorial credit: Ron Adar / Shutterstock.com

It may seem surprising in the wake of QAnon, the January 6 Capitol attack, COVID-19 denial, and a worldwide surge in antivaccine conspiracy theories, but generations of skeptics have had to contend with an all-too-common complaint that paranormal, pseudoscientific, and conspiratorial claims are *just not important*. Researchers into popular misinformation and disinformation have frequently been accused of wasting time on supposedly trivial claims. Surely everyone already knows that the earth isn't flat, Bigfoot isn't real, and vaccines protect against sickness—right? Why waste time on marginal beliefs when there are *real* problems to study?

If anything good has come from the past few harrowing years of pandemic and political upheaval, it is a growing recognition that bogus claims and false beliefs can matter quite a bit. Misinformation reaches far beyond the margins of society. Indeed, preposterous falsehoods and made-up nonsense can and do *shape world events* on the very largest scales.

As former President Barack Obama recently observed, the spread of disinformation on social media and a "media environment that elevates falsehoods as much as truths" has "created real challenges for our democracy." Obama is merely the latest to join a chorus of journalists, scholars, science communicators, public health officials, and political leaders who have raised the alarm about our current "plague of misinformation"—a global "infodemic."[1]

Political propaganda is driving a brutal war across Europe's largest country. "Stolen election" and "coming storm" conspiracy claims have incited violence and threatened to overturn a U.S. presidential election. Politicians and media figures are inciting a new wave of hatred against vulnerable LGBTQ teachers with cynical false claims about "grooming" children in public schools. The climate crisis burns out of control, with necessary action having been delayed for decades by denialist pseudoscience. More than *one million Americans have died* of a pandemic disease that deniers have variously claimed to be a deliberate "plandemic" or a nonexistent "media hoax" (see "Plandemic Conspiracy Video Goes Viral, Sells Books" in the September/October 2020 SI). *Hun-*

dreds of thousands of those deaths may have been prevented if not for widespread conspiracy claims that vaccines don't work, contain microchips, cause COVID-19, kill patients, or somehow turn people into magnets.

A Rising Tide?

With stakes so high, I'm grateful that the critical study of patent nonsense—once a backwater for quirky obsessives such as yours truly—is finally attracting greater attention from respectable mainstream journalism and scholarship. "Misinformation has reached crisis proportions," warned one notable 2021 paper in *Proceedings of the National Academy of Sciences* (West and Bergstrom 2021). "It poses a risk to international peace, interferes with democratic decision making, endangers the well-being of the planet, and threatens public health."

This is a "crisis" by any reasonable measure. Is it a crisis unique to our time? Generations of skeptics have viewed their own decades in a similar light. "It is well known that I am the culprit responsible for the founding of the Committee for the Scientific Investigation of Claims of the Paranormal," recalled philosopher Paul Kurtz. "Why did I do so? Because I was dismayed in 1976 by the rising tide of belief in the paranormal and the lack of adequate scientific examinations of these claims. At that time a wide range of claims were everywhere present" (Kurtz 2001).

Questionable claims were indeed everywhere in the 1970s. A quick glance at the earliest issues of this magazine (originally *The Zetetic*) reveals a surprisingly current slate of examples, including psychics, UFOs, conspiracy theories, and ancient aliens. Was this a rising tide or just the way things tend to be?

Carl Sagan had little patience for "rising tide" rhetoric. When one looks back at popular misinformation, at "almost any time in human history, you find just as many examples as from our present time," Sagan explained. "This is an endemic human characteristic—to be credulous, to believe what others tell us, to prefer what feels good to what's true" (Head 2006, 114).

The "infodemic" may seem new, but in some ways it's as old as civilization. Large majorities of people have always believed untrue conspiracy stories, "vulgar errors," "extraordinary popular delusions," and bogus paranormal claims. False claims and muddy thinking have been human universals throughout history.

What's changed is the level of *threat* that credulity poses.

"It's not that there's something new in our way of thinking," Sagan explained. "It's that credulous and confused thinking can be much more lethal in ways it was never before." In a technological, interconnected modern world, "The dangers of not thinking clearly are much greater now than ever before" (Head 2006, 114).

Digital communication has accelerated disinformation far beyond anything *Gulliver's Travels* author Jonathan Swift could have imagined when he observed, "Falsehood flies, and truth comes limping after it." Social media algorithms and partisan "infotainment" amplify congenial false beliefs, deepening the chasm between reality and "alternative facts." And, at the very same time, hanging terrifyingly over everything, is climate change and rising authoritarianism. The pandemic exponentially multiplied the *damage* misinformation can do.

What Can Be Done?

"How can we mitigate the spread of disinformation and misinformation? This is one of the current burning questions in social, political and media circles across the world," holds a recent paper in the journal *Humanities and Social Sciences Communications* (Carrasco-Farre 2022). "The answer is complicated," explains the author, but I think we can start with that one simple lesson from the history of skepticism so far.

If we wish to confront misinformation, we must first accept that misinformation *matters*. Moreover, *it always has mattered*. I've spent my career arguing that the "third domain" of weird beliefs dually rejected by mainstream science and religion is a chronically understudied major pillar of human experience—and, ultimately, human actions. The "fringe" is not fringe but central to the lives of billions. The destiny of nations hinges on false beliefs just as much as on truths. Misinformation may be the central challenge for our future as a species.

This understanding has historically proven hard to sustain. Society perpetually defaults to dismissing fringe claims as unworthy of attention. Mainstream intellectuals rarely take unseemly nonsense seriously—until it surges to a scale that cannot be avoided.

This is a folly of the wise. If we ignore fringe claims until they threaten

catastrophe, the damage is already done. Swift could have been talking about QAnon, "stolen election" claims, or COVID-19 conspiracy theories when he warned, "if a lie be believed only for an hour, it hath done its work … so that when men come to be undeceived, it is too late; the jest is over, and the tale hath had its effect."

It's dangerous to treat misinformation as an afterthought. Consider the dismay of outgoing National Institutes of Health Director Dr. Francis Collins, who "never imagined" tens of millions of Americans would refuse safe and effective COVID-19 vaccines "because of misinformation and disinformation that somehow dominated all of the ways in which people were getting their answers."

Collins and his colleagues are experts on medical science—which is largely irrelevant in the antivaccine space. Collins ruefully put his finger on a key issue: "Maybe we underinvested in research on human behavior." What was needed was specialist knowledge of the history, organization, tactics, and pseudoscientific rhetoric of the antivaccine movement. Experienced watchdogs anticipated a well-honed and effective misinformation campaign against COVID-19 vaccines. After all, antivaccine fearmongering is an *industry*. The pandemic was always going to be a gold rush for antivaccine activists, grifters, and moral entrepreneurs. It was inevitable.

Misinformation Preparedness

And yet cynical, weaponized disinformation is only part of the problem. The truth is that a vast global cauldron of misinformation boils and churns at all times, even when we forget it is there. Every one of us is a reservoir of contagious ideas and a potential host for many more. Fringe claims constantly multiply and compete in an unseen ecosystem, awaiting conditions to break free.

It isn't enough to merely *react* to exponential explosions of viral nonsense. To even begin to manage our endemic misinformation problem, we need sustained, ongoing, proactive critical attention from dedicated experts *before* seemingly marginal claims mutate or metastasize to threaten society.

For several decades, the largely volunteer skeptical movement has attempted to fill that need. The "emerging field of disinformation studies" is another attempt—a research trend that is both wider and more narrow in scope than traditional "scientific skepticism."

The new crop of academics, media critics, and independent researchers tend to focus on conspiracy theories and political extremism (such as tracking the back-channel chatter of Ottawa "convoy" occupiers in early 2022), COVID-19 misinformation, and the mechanisms through which misinformation is distributed (such as social media, online influencers, and bot networks). These are natural areas to prioritize because they are urgent, dangerous, quantifiable, or some combination of all three.

But this isn't the whole story because extremist beliefs do not exist in a vacuum. The deadliest fringe claims share mechanisms and conceptual structure with the goofiest ones—and harmless claims do not always stay that way. Fringe claims hybridize, cross-pollinate, and mutually reinforce each other. Moreover, acceptance of one predicts acceptance of others (as demonstrated, for example, by flat-earthers and wellness influencers drawn into QAnon).

So, where do we go from here? Can we sustain this moment of heightened awareness, build on it, and construct more comprehensive and effective new approaches to the study of false claims?

Carl Sagan famously warned (here in Skeptical Inquirer in 1995) that global society's "combustible mixture of ignorance and power" was "going to blow up in our faces" (Sagan 1995). He feared that "pseudoscience and superstition will seem year by year more tempting, the siren song of unreason more sonorous and attractive" as our "ethnic or national prejudices are aroused … when we agonize about our diminished cosmic place and purpose, or when fanaticism is bubbling up around us." And he urged us to be ready when humanity's "demons begin to stir" (Sagan 1996, 26–27).

Let's face it: despite this warning, none of us were truly prepared when Sagan's dreaded moment came. Can we somehow catch up and meet the challenge of our time? And will we be better prepared for the next inevitable "demon-haunted" infodemic? I'd like to find out. ■

Note

1. This term was apparently coined in 2003 but gained new currency in the context of COVID-19 when it was used by high profile figures such as Tedros Adhanom Ghebreyesus, director-general of the World Health Organization. (See "Words We're Watching: Infodemic," Merriam-Webster, https://www.merriam-webster.com/words-at-play/words-were-watching-infodemic-meaning.)

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Daniel Loxton is an author, illustrator, and skeptical researcher. He was formerly the longtime editor of *Junior Skeptic* for *Skeptic* magazine. His books include *Evolution—How We and All Living Things Came to Be* and *Abominable Science!* (coauthored with Don Prothero). He is a Committee for Skeptical Inquiry fellow. This commentary is adapted from his first "Fringe Worthy" column on skepticalinquirer.org.

Rebooting Critical Thinking

JULIA LAVARNWAY

Helen Lee Bouygues. Credit: The Reboot Foundation.

Helen Lee Bouygues is a world-renowned misinformation and critical thinking expert. In 2018, she founded the Paris-based Reboot Foundation, whose mission is to promote richer, more reflective forms of thought in schools, homes, and businesses—especially in the face of our vastly changing technology. The foundation also funds efforts to better integrate critical thinking into the daily lives of people around the world. It conducts surveys and opinion polls, leads its own research, and supports the work of independent scholars. Bouygues is also a columnist for Forbes *and is working on a book on critical thinking. Recently, she answered a few questions for* SKEPTICAL INQUIRER.

SKEPTICAL INQUIRER magazine is published by the Committee for Skeptical Inquiry (CSI), whose mission is "to promote scientific inquiry, critical investigation, and the use of reason in examining controversial and extraordinary claims." As an advocate of critical thinking, do you also consider yourself a skeptic?

Being a good critical thinker means questioning your assumptions, walking through problems logically, and then reflecting on your thinking to better understand it. I think it's important to read widely and not rely on any one source for your information. Anyone can be a better critical thinker if they question assumptions, reason through logic, and seek out diversity of thought. Most of the time, I believe it's better to ask good questions than to have all the answers. Does that make me a skeptic? Perhaps.

When did you first become aware that critical thinking is an important life skill?

Growing up in South Korea in the 1970s and 1980s, I learned how important issues around information literacy and the spread of information are. During that time, South Korea was not the stable and open democratic society it is today. Growing up, I witnessed the prevalence of government propaganda. For example, I recall making anti-communist propaganda posters during "arts and crafts" time for the military-led government. The experience was disquieting; children know intuitively that something is wrong with this kind of coerced expression. It was also completely antithetical to the liberal education I received at home from my parents and grandparents.

You came up with the acronym SHARP as a valuable component for any critical thinker's toolkit. Can you tell me a little about it?

SHARP thinking[1] is a step-by-step approach to reasoning to engage in better decision making. Part reflection, part reasoning, part creativity, SHARP thinking can empower people at school, at home, and at work.

SHARP stands for: Stop, Hone, Accumulate, Reason, and Perspectivize.

These steps can be applied to any scenario or problem—either in professional or personal life—that requires deep, reflective, and creative thinking. Using them can help improve decision-making and reasoning habits.

1. Stop. Before we can improve thinking, we have to slow it down. In order to engage in rational thought, it's necessary to first resist conclusions based on automatic responses or raw emotions.

2. Hone. Once we begin looking at our thinking from the outside, we can start refining it by asking lots of questions. What reasons do I have for thinking what I think? How do other people approach this issue? What evidence could I acquire to better back up or refine my position?

3. Accumulate. We need to "go deep" and start accumulating evidence. Effective thinking requires experience with a given subject matter, including exposure to well-researched ideas and facts.

4. Reason. Once we have accumulated and analyzed evidence, we need to draw and refine conclusions on the basis of it. This is reasoning, and it is vital to learn the basics of formal logic. These rules of reasoning determine how conclusions can be drawn legitimately from premises.

5. Perspectivize. Only by subjecting our ideas and arguments to the critiques

of others can we determine whether they succeed or fail and how they can be improved. A key part of critical thinking is, therefore, perspectivizing: opening up our thinking to outside perspectives.

As you said in a recent *Forbes* article, the Reboot Foundation doesn't advocate stand-alone critical thinking courses for students. Why? What is the best way to foster critical thinking in young students?

Reboot's Teachers' Guide to Critical Thinking[2] was developed with teachers in different subject areas and grade levels around the country. We don't advocate stand-alone critical thinking courses. We believe the best approach is to have a critical thinking focus throughout the curriculum. For example, we advocate for science labs that afford students the opportunity to design their own experiments and test their own hypothesis about how to gain knowledge—rather than simply following recipes to duplicate results already known. We advise teachers to facilitate in-class debates where students are made responsible for researching topics like the death penalty, developing a knowledge base, and using it to argue for particular positions.

Throughout the process, teachers should also give students the opportunity to reflect on their progress in articulating and refining their viewpoints, through explicit journaling projects or in-class discussions. The goal is to develop students' abilities to reflect on their own learning and begin to develop interests self-consciously and intentionally that will stay with them when they leave the classroom.

To best foster the development of natural curiosity into a genuine and abiding interest in learning and knowledge, schools need to give students room to pursue their own interests, develop their own views, and struggle with open-ended questions. Schools need, in other words, to prioritize critical thinking for teens.[3]

Recent research partially funded by the Reboot Foundation looked at methods of "prebunking." What is prebunking, and how does it differ from a debunking approach?

We helped fund research at the University of Cambridge and médialab Sciences Po in Paris to study this idea of "prebunking."[4] "Prebunking" teaches people about various disinformation techniques so that they'll know it when they see it in their social media feeds. This research looks at scalable ways to guard against misinformation in our society. (See Nick Tiller's article in this issue, p. 40.)

The study found that teaching people about how misinformation campaigns operate can help them recognize them. Significantly, this research points to an important educational tool—one that is inexpensive, accessible, and highly scalable—in the ongoing fight against misinformation. It is a promising step in what unfortunately may be a long journey.

The Reboot Foundation recently teamed up with Indiana University to conduct research into critical thinking and education. What did you find?

Reboot funded researchers at Indiana University to explore new ways to improve critical thinking through short-targeted interventions.[5] We found that educators can develop critical thinking skills in their students by using a simple method that is easy to implement across diverse groups of students. Moreover, the implications are significant for teachers across all spectrums of education.

Our results showed a way of exploring critical thinking skills that does not involve overly complicated or lengthy ways of teaching them. Instead, the research found that small amounts of critical thinking practice, employing things as basic as analogies and multiple-choice quizzes, allow the fast and efficient teaching of critical thinking skills. And they're techniques that any teacher can use.

"Small amounts of critical thinking practice … allow the fast and efficient teaching of critical thinking skills."

In your opinion, what is the number one factor in the spread of misinformation, and what is the number one thing we all can do to prevent it?

The internet and social media enable the proliferation of misinformation and create rabbit holes. For example, early in the recent pandemic, Reboot conducted a study looking at the impact of social media on COVID-19 misinformation.[6] Our study found that the more people used social media, the more likely they were to believe COVID-19 myths.

We need to prioritize critical thinking in our education system, at all levels, including continuing education for adults. The phrase "critical thinking" is routinely heard as a buzzword in education circles, but we simply don't do a good job teaching it. While critical thinking may be a "high-level" skill, it's not just for "gifted and talented" students or only older students; all students are capable of and need to learn these skills, and they can begin at an early age. ■

Notes

1. What is SHARP? Online at https://reboot-foundation.org/en/sharp-thinking/.
2. How to Teach Critical Thinking. Online at https://reboot-foundation.org/en/teachers-guide-to-critical-thinking/.
3. Critical Thinking Development: Ages 13 and older. Online at https://reboot-foundation.org/en/parent-guide/ages-13-plus/.
4. Press Release: New Research from Reboot Identifies Strategies to Fight COVID Misinformation. Online at https://reboot-foundation.org/en/strategies-fight-covid-misinformation/.
5. A Scalable, Versatile Approach for Improving Critical Thinking Skills. Online athttps://reboot-foundation.org/en/improving-critical-thinking-skills/.
6. Going Viral: How Social Media Is Making the Spread of the Coronavirus Worse. Online at https://reboot-foundation.org/en/going-viral/.

[INVESTIGATIVE FILES JOE NICKELL

Joe Nickell, PhD, has written treatises on old writings and writing materials as well as on detecting forged handwriting and artifacts. He has been involved in many famous cases.

Double Mystery: The Murder and Secret Life of ... Jack the Ripper?

Two mysteries—one real and the second a work as questionable as it was sensational—have attended the death of James Maybrick (1838–1889), a cotton merchant of Liverpool, England, who also had a home in Norfolk, Virginia.

The first enigma, immediately after his questioned passing, would result in his much younger wife's conviction for poisoning him. The second, however—which did not surface until 1991 in the form of a doubtful diary—purportedly revealed Maybrick's identity as the mad serial killer known as Jack the Ripper! I was prominently involved in the latter mystery, examining the diary for a major client in my frequent persona of questioned historical document consultant.

The Maybricks

James Maybrick's cotton-trading business required his traveling regularly between his Liverpool and Norfolk homes. On one such six-day trip, he met a young beauty, Florence "Florie" Chandler (1862–1941), and love flourished despite (or because of?) the difference in their ages: nearly twenty-four years. As was commonly said, he was old enough to be her father. They were married on July 27, 1881.

The couple settled in at Maybrick's home, "Battlecrease House," in the Liverpool suburb of Aigburth. Unfortunately, while their two children (James Chandler and Gladys Evelyn, born in 1882 and 1886, respectively) gave the family a look of respectability, Maybrick returned to his several mistresses, and in time a disillusioned Florence had an affair with one Alfred Brierley, a fellow cotton broker known to her husband. It seems that on one occasion in early 1889, on the pretext of visiting an aunt who was having an operation, she went to London where she and her lover spent "three nights at an hotel" (Lustgarten [1949] 1999, 136; see also Colquhoun 2014, 35–37).

On March 31, 1889, the Maybricks had a fierce quarrel over Brierley, during which James gave Florence a black eye. She threatened to leave home, but, considering the children, they reconciled. In less than a month, however, James Maybrick began to show signs of an illness that would soon prove fatal. At first, he was stricken with pain and vomiting. With his wife devotedly nursing him, he became better—then alternately worse, better again, and so on, until finally, at the age of fifty, James Maybrick lay dead (Boswell and Thompson 1954, 7–16).

The First Mystery: Arsenic Death?

But even the death itself was not the end of it. Onlookers had become suspicious, and there had begun another series of activities. As true-crime writer Edgar Lustgarten ([1949] 1999, 137) would sum it up:

> And then—the searching of the house and the discovery of arsenic; in jars, in packets, in tumblers, in pans, in bottles, on garments, on rags, on pocket handkerchiefs. This sinister search assumed still graver significance when a quantity of arsenic was found in Maybrick's corpse.

James Maybrick's ordeal ended on Saturday, May 11, 1889. It was followed by the postmortem on Monday, May 13, and that in turn—as Tuesday surely came—saw the arrest of Florence Maybrick for the murder of her husband.

Her trial began at Liverpool Assizes on July 31, 1889, with John Addison as leading Counsel for the Crown and Sir Charles Russell appearing on behalf of Florence Maybrick. As it happened, servants and nurses of James Maybrick had been alerted by his suspicious brothers Michael and Edwin to keep watch on Florence (Boswell and Thompson 1954, 15).

Indeed, she had already been observed as early as Friday, April 26. A bottle of an apparent medicine had arrived in the mail, and a maid took it upstairs to the master's bedroom. Twenty-four hours later, Maybrick was vomiting and experiencing other symptoms, including numbness in the legs. Florence alleged to the nursemaid, Alice Yapp, that James had taken "an overdose" of the medicine. After James had left on horseback for some engagements of the day, she rushed upstairs and got rid of the medicine (or perhaps it would be more correct to say the evidence of the doctored medicine) by pouring it in the sink (Colquhoun 2014, 64–65).

She was also seen soaking fly-papers in a basin of water—a means of extracting the arsenic that impregnated those sticky-coated papers made for trapping and killing flies. She had bought the first lot of a dozen such papers from a nearby *chemist* (pharmacist), telling him that flies had become troublesome in the kitchen. She subsequently bought a second lot of two dozen from another chemist at the point, the prosecutor stressed, "when her husband was just recovering" (Boswell and Thompson 1954, 33–34). In response, the defense called attention to the fact that arsenic was commonly used in cosmetics. At trial, Florence Maybrick claimed she had lost a prescription she had been given in America and, "having a slight skin eruption, tried to concoct a substitute" because she planned to attend a ball (Lustgarten [1949] 1999, 155). Had she lied about the flies or the skin eruption—or both? Do not her conflicting claims corroborate her guilt?

Again, the prosecutor noted that during Maybrick's illness, his wife had "regulated" all his medicines. After the trained nurses were employed, one stated that she saw Mrs. Maybrick tamper with a medicine—an over-the-counter product called Valentine's Meat Juice ("Florence Maybrick" 2022). The tampering took place just prior to a dose being due, although as Maybrick had grown sicker, his two brothers had forbidden Florence to have access to him ("James Maybrick" 2022). A nurse intercepted the medicine at that point, and it was subsequently discovered to contain one-half grain of arsenic. In court, Mrs. Maybrick claimed her husband, being depressed, had called attention to a certain powder that he insisted was harmless and implored her to add it to his food (Lustgarten [1949] 1999, 141, 155; Colquhoun 2014, 265–268).

The defense claimed that Maybrick had formerly used arsenic as a nerve tonic when he was in America, and one of his doctors said from the witness stand, "I gathered as much from his conversation." The defense used such hearsay to suggest Maybrick was even *addicted* to arsenic, whereas the prosecution insisted, "he was not an arsenic-eater; he was a healthy, careful man; in April he was sick for the first time in his life" (Lustgarten [1949] 1999, 157). Maybrick's brother Michael expressed similar sentiments, and he had become highly suspicious of his sister-in-law (Colquhoun 2014, 98–99, 118).

Any seeming inconsistency between the ingestion of significant amounts of arsenic on the one hand and relatively smaller amounts showing at autopsy have a potentially simple explanation—namely, that much of the induced poison was expelled by Maybrick's chronic vomiting. In contrast, his wife's "explanations" of her involvement with arsenic seem rather pathetic attempts to make guilty acts appear innocent.

More Evidence

Then there was Florence's secret letter addressed to her "Dearest" (Brierley) on May 8. The prosecution saw it as something of a trump card, which one of the spies (again the servant, Alice Yapp) had intercepted. Prosecutor Addison stressed a particular passage: "Since my return I have been nursing M. day and night. He is sick unto death. The doctors held a consultation yesterday, and now all depends upon how long his strength will hold out" (qtd. in full in Lustgarten [1949] 1999, 142).

Prosecutor Addison reasoned that Florence Maybrick, having betrayed her husband, might have poisoned him as well, expecting to replace him with her lover. Here, I think we must begin to consider what I term the *coincidence factor*. While remarkable coincidences can occur, we must wonder at an abundance of them in this case. Are they indeed such, or do they instead suggest an actual connection, a linkage revealing something more than mere chance?

- For example, less than a month after he and his wife had a violent quarrel, Maybrick was showing signs of what would prove a fatal illness.

• Florence had written the letter to her "Dearest" just three days before her husband passed.

• Note how coldly in the letter she twice refers to her spouse simply as "M."—his last initial.

• Also note that she writes of his condition—which one of his doctors had characterized as "hopeful"—that "He is sick unto death."

• How coincidental that (by her claims) both she and her husband were using arsenic—she allegedly in cosmetic preparations and he in food or tonic.

• Suspiciously, although James Maybrick was supposedly already taking arsenic, his wife said he had implored her to put it in his food, as opposed to him doing it himself.

• Recall that Florence Maybrick had twice purchased fly papers—from which she extracted the arsenic—once purchasing a dozen from one chemist then just three days later two dozen from another.

• As the prosecutor saw it, "It is an extraordinary thing, that when her husband was just recovering she should have bought these further fly-papers" (Lustgarten [1949] 1999, 137–157). Quite the telling "coincidence," he is saying.

We might dismiss one or more such coincidences as just that, but here we have a cluster of such. Taken together, they seem to clearly incriminate Florence Maybrick as the murderess of her husband, from whom she wished to be free.

And so the jury found. She was convicted and sentenced to death by hanging. However, following a public outcry, the Home Secretary concluded she did give her husband poison with the *intent* to cause his death, but that there was reasonable doubt whether the poison was the actual *cause* of his death. Her sentence was commuted to life imprisonment. She served over fourteen years in prison then was released in 1904. After writing a self-serving book (Maybrick 1904), she went on the lecture circuit for four years then returned to America as a recluse, resuming the name Florence E. Chandler and living at last at a little cottage in rural Connecticut. She died in 1941 (Boswell and Thompson 1954, 162–170).

She was interviewed by a newspaper in 1927, thirty-eight years after she had last seen Brierley. She was described as "sad-faced, gentle-voiced, with hair turned to silver." She told the paper that, looking back to the time she was released from prison, she had been "bitterly disappointed" to discover "that the man for whom I had sacrificed everything had forgotten me" (quoted in Colquhoun 2014, 330).

Mystery No. 2: 'Ripper' Revealed?

Fast forward to 1991 when the purported diary of London's maniacal serial killer, "Jack the Ripper," surfaced. If genuine, the volume solved the mystery of his identity: he was a fifty-year-old cotton merchant from Liverpool named James Maybrick! The diary does not actually name its purported author, but entries explain how it was its author—seeking revenge on women for his unfaithful wife—who committed the gruesome knife slayings in drug-induced frenzies. A sample entry reads (quoted in Harrison 1993, 275):

> The bitch and her whoring master will rue the day I first saw them together. I said I am clever, very clever. Whitechapel Liverpool, Whitechapel London, *ha ha*. No one could possibly place it together. And indeed for there is no reason for anyone to do so.

A sensation at the time, the diary was to be published by a British firm and copublished in the United States by Warner Books. For authentication, Warner executives turned to Kenneth Rendell, the manuscript expert who had investigated the notorious "Hitler Diaries" for *Newsweek*; Rendell in turn contacted me. While arrangements were made to insure the diary for $1 million and bring it to the United States, I secured a forensic laboratory in Chicago and assembled a team of specialist ink analysts and others with relevant expertise (Nickell 1997, 209).

Meanwhile, I addressed such features as provenance (or historical record), in-

ternal evidence, and writing materials (on which I had written a specialized book [Nickell 1990]). As it happened, the diary was suspect at every turn. According to its owner, a scrap-metal dealer named Mike Barrett, it had been a gift from a barroom acquaintance who had since died. In manuscript expert parlance, this is derided as "a dead man's provenance."

The text was equally suspicious; its author seemed to go out of his way to include "Ripper" trivia, including many heavy-handed examples. Neither did the diarist always get his facts straight. Moreover, the volume was not even a proper diary but a recycled antique scrapbook: its previously used pages—shown by rectangular areas of cellulose degradation on the flyleaf—had been cut out and the remaining blank ones pressed into service. This looked for all the world like an amateurish forger was intent on supplying himself with passably old paper (Nickell 2009, 45).

Our team of experts met at the laboratory of noted handwriting analyst Maureen Casey Owens. The diary was examined with stereomicroscope, infrared and ultraviolet light, and other methods, and ink was sampled for thin-layer chromatographic analysis. The various instrumental tests showed little of importance beyond what appeared a rather obviously dummied-up work. But the writing itself was telling.

Indeed, the most significant evidence was provided by the handwriting that not only failed to match James Maybrick's own script but was not consistent with that of the late 1880s. All of us contributed to Rendell's report (1993), which concluded that all areas of analysis were indicative of a hoax.

By way of a sequel, in late June 1994 Mike Barrett finally confessed that he had forged the Ripper diary—as I had deduced. He composed the text with a word processor, removed the previously used pages from an old album, and wrote the unconvincing script with pen and traditional ink purchased from an art store. Soon, however—perhaps mindful of his perilous legal position—he retracted his confession. Interested readers can still read my account of the affair (Nickell 2009, 39–52) and muse about cynicism and gullibility. As to James Maybrick—from sensational murder victim to hoax subject as an infamous serial killer—the perfunctory phrase "Rest in Peace" seems never really to have applied. ■

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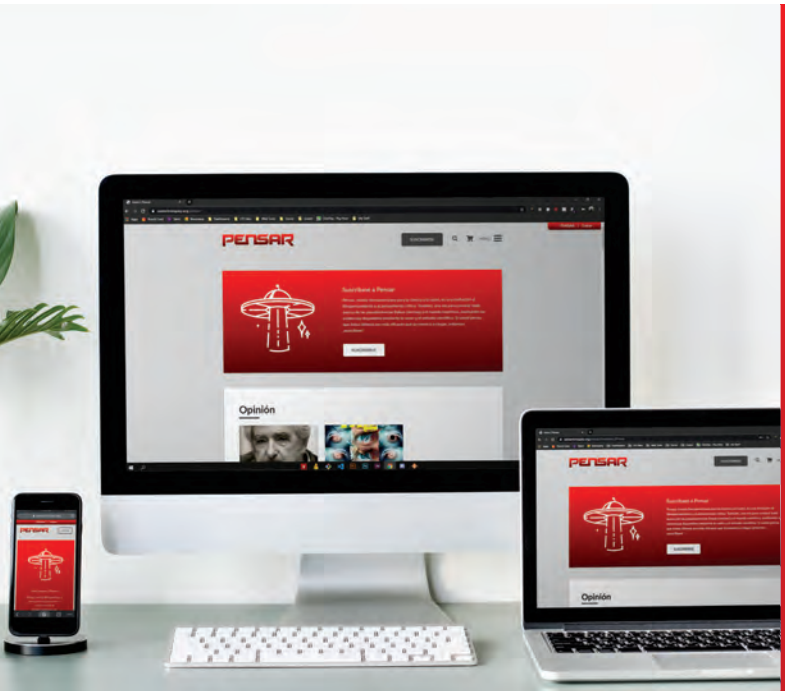

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[NOTES ON A STRANGE WORLD

MASSIMO POLIDORO

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The Dreams of Our Ancestors

Montignac, France, where the Lascaux caves drew tourists from all over the world.

One criticism often directed at skeptics is that they take away mystery from the world. In reality, what is taken away by skeptical investigations are often illusions, deceptions, self-deception, and frauds. After these are taken away, true mysteries still abound on our planet—and they can be found anywhere, even in a long-forgotten cave.

It was the end of summer 1940 in the village of Montignac in southwestern France, far from Paris, where only three months earlier the swastika flag had begun to wave over the city. The horror of the Nazi occupation and the war that was then at the gates was a concern for everyone, but it did not prevent children from being kids and setting out one day to search for treasure.

According to local legends at the time, on the hill overlooking Montignac there was a secret entrance to an underground passage leading to the manor of Lascaux. People thought there might be chests full of jewels and doubloons hidden down there.

One day, Marcel Ravidat, a young apprentice mechanic from the local garage, ventured up the hill in search of adventure with his dog Robot. The latter slipped into a fox hole, creating a small landslide that revealed the entrance to a cave. It was too dark to explore, so Marcel had to postpone the search.

He returned four days later, on September 12, with three friends: Jacques Marsals, Georges Agniel, and Simone Coencas. By the light of an oil lamp, the three slipped into the hole and found themselves inside a cave of about 100 feet. Beyond a narrowing, the boys realized that there was indeed treasure down there—but it was very different from what they imagined.

By flickering flame, the kids discovered around them a spectacular world of rock paintings: masterpieces never seen before. The caves were labyrinthine, and every room turned out to be covered with paintings of animals of all kinds. Faced with a hole in the ground that opened into darkness, the boys decided to go down tied to a rope. The hole turned out to be a well about twenty-five feet deep, and—incredi-

bly—even down there someone had painted a schematized man who has his arms outstretched and looks frightened. In front of the man is a bison, pierced by a javelin, which seems to be attacking him.

"We did not believe our eyes," Simone Coencas recalled seventy years later. "We had decided to keep the secret for us, but the news spread quickly" (Barcellona 2020). At the time of that interview, Coencas was the last survivor of the group; he died on February 2, 2020.

Despite the curfew and the oppressive social atmosphere in the country, the incredible discovery could not be hidden or ignored. Among the first to visit the caves was Father Henri Breuil, abbot and famous expert in prehistory at the College de France, who took refuge in the area. He remained speechless in front of what appeared to be an indisputable discovery of exceptional importance for the quantity, size, and quality of the art.

On the walls there was a true triumph of animals colored in ocher: horses, deer, ibex, and even an auroch, a type of cattle that is now extinct. Dating of objects in the cave has established that what Breuil called the "Sistine Chapel of prehistory" was created by men who lived between 18,000 and 17,000 years ago.

Detail of the Lascaux cave paintings

Everyone wanted to see that wonder, and so the tourism began. It is estimated that over a million people visited the cave between 1948 and 1963, but the carbon dioxide produced by the visitors' breath, the increase in temperature, and the artificial lighting began to damage the fragile paintings. The caves were then closed to the public and later declared a UNESCO World Heritage site in 1979. In 1983, a partial replica of the site, Lascaux 2, was opened. A third one was later built and sent on tour around the world. Finally, in 2016, Lascaux 4, a complete reconstruction of the original cave, opened.

Questions about the meaning of the paintings, however, remain largely unsolved. According to scholars, those who drew the approximately 6,000 figures painted on the walls were Cro-Magnon, an ancient form of *Homo sapiens* widespread in the Upper Paleolithic in Europe, Asia, North Africa, and North America. They were a primitive people but already endowed with aesthetic and artistic taste. They wore jewelry, used feathers as accessories for their clothing, and used pigments extracted from clams to decorate themselves. These were activities that took time and, therefore, had to be important to them—perhaps as much as getting food and shelter.

The paintings must be seen in this light. Lascaux, like the other caves covered with rock paintings, were not dwellings. Nobody lived in those caves; there are very few remains of fires, and those that are there probably served as a source of light for the painters.

Even fewer are the animal bones that may have been eaten in the caves, a fact that introduces a new mystery. Those bones are 90 percent reindeer. About 1,000 animals are painted on the walls of Lascaux—yet not a single reindeer is pictured. Therefore, it seems difficult to imagine that these paintings were propitiatory rituals for hunting, as was often claimed.

Were those caves places of prayer or meditation, where people went to worship something? Or did they have a social function? Did they represent a point of reference recognizable to other Cro-Magnons, a way therefore to define one's own identity, to recognize oneself as part of the same population? We do not know, but they certainly seem to be a confirmation of the fact that art, the symbolic representation of something real, played an important role in the life of those people. And it is the reason millions of people every year want to see the paintings today. ■

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[THE PHILOSOPHER'S CORNER MASSIMO PIGLIUCCI

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A Different Take on E.O. Wilson

Wilson at a "fireside chat" during which he received the Addison Emery Verrill Medal in 2007. Image Credit: Ragesoss - Wikipedia

Here is a Roman joke: Two old friends who haven't seen each other in a while happen to meet in the street. One says to the other: "Oh, hi! I thought you were dead!"

"What on earth makes you say so?"

"Well, all of a sudden people were speaking well of you …"

That joke came to my mind when I read three short tributes to biologist E.O. Wilson in Skeptical Inquirer (May/June 2022). Wilson passed away on December 26, 2021, at age ninety-two. The tributes are by evolutionary biologist and science popularizer Richard Dawkins, evolutionary developmental biologist Sean B. Carroll, and cognitive linguist Steven Pinker. Predictably, all three portraits are very positive. Just as predictably, they are somewhat flawed.

Let me first acknowledge where I agree with Dawkins, Carroll, and Pinker. Wilson, whom I've met a few times during my career as an evolutionary biologist first and a philosopher of science later, was indubitably one of the towering figures in late-twentieth-century biology. His expertise on social insects, and ants in particular, was unparalleled. As a science writer, he won two Pulitzer Prizes. Right there that's more than enough to enshrine him in the history of biology, which is no small thing. For more (well justified) praise, see Ken Frazier's in-depth biographical essay in the May/June 2022 SI (Frazier 2022).

That said, some of his scientific ideas were questionable, and some of his personal ethics were borderline despicable; this ought to be acknowledged as well. After all, as skeptics we are presumably interested in the truth about the man, not in mythologizing him.

One notion for which Wilson is lauded by both Dawkins and Pinker is that of consilience (the title of one of Wilson's best-selling books). This is the idea that we should strive toward a unification of all areas of human inquiry, including sciences and humanities. Sounds good, except that closer examination reveals that Wilson engaged in the usual, badly philosophically informed, reductionist tendency not to unify but rather to subsume other fields into the sciences (for details, see Pigliucci 2012). Pinker sarcastically complains that none of his critics ever managed to explain what "reductionism" means, which I find odd. In the spirit of being helpful, here is a good reference to look up: *Stanford Encyclopedia of Philosophy*'s entry on Scientific reduction (van Riel and van Gulick n.d.).

After all, as skeptics we are presumably interested in the truth about the man, not in mythologizing him.

Incidentally, of *Consilience* (the book) CSI founder Paul Kurtz wrote in these pages (SI, July/August 1998), as Frazier noted: "Many of [Wilson's] claims need further skeptical scrutiny. Some skeptics will no doubt reject many of Wilson's speculations as unwarranted." Count me in.

Arguably the most controversial idea ever put forth by Wilson appeared as the last chapter in his voluminous *Sociobiology: The New Synthesis*, which was published in 1975. It single-handedly gave birth to an entire field of research, human sociobiology, which later morphed into what is known as evolutionary psychology. However, it is to be noted that Wilson's technical expertise most certainly did not extend from ants to *Homo sapiens*.

The basic notion is perfectly sound: human beings are animals; therefore, it is likely that at least some aspects of our behavior are genetically grounded and evolved in part as a result of natural selection. The devil, of course, is in the details. It's a bit too easy, if one is not careful, to slide from the legitimate scientific study of human behavior to simplistic and largely untestable notions that suspiciously resemble common misogynist and racist tropes. Later in his career, Wilson characterized those criticizing him as having "no interest in the subject beyond discrediting it. They appeared to understand very little of its real substance" (Wilson 1994, 339), which is more than a bit disingenuous, considering that the critics included several prominent evolutionary biologists and philosophers of science.

While Wilson has sometimes too cavalierly been accused of ideological sins—most recently in an astoundingly sloppy article published at scientificamerican.com (McLemore 2021) that was rightly criticized by Dawkins—ongoing research into the Wilson archives at the Library of Congress by historians Stacy Farina and Matthew Gibbons is helping paint a more troublesome picture of Wilson the man (Farina and Gibbons 2022).

Among other things, Farina and Gibbons found damning evidence of sustained support by Wilson of notorious racist psychologist John Philippe Rushton. Rushton enlisted Wilson's help to survive a tenure challenge at the University of Western Ontario, and Wilson readily obliged. In fact, Wilson went so far as soliciting support for Rushton from the National Association of Scholars, a right-wing advocacy group. Moreover, he sponsored a highly questionable paper by Rushton for the prestigious *Proceedings of the National Academy of Sciences*, going on to accept the paper while engaging in at least dubious editorial decision making.

Wilson also enthusiastically blurbed a book by journalist Nicholas Wade, *A Troublesome Inheritance*, which advances the notion of "racial realism" and raises the possibility of genetically grounded differences between races in cognitive abilities. All of that is sheer nonsense, empirically speaking (Barbujani and Pigliucci 2013), and obviously ethically problematic, philosophically speaking. Moreover, the archival material also shows that Wilson corresponded with several other notorious racists, such as Arthur Jensen and Richard J. Herrn-

Editorial credit: frantic00 / Shutterstock.com

Ongoing research into the Wilson archives at the Library of Congress is helping paint a more troublesome picture of Wilson the man.

stein. This is more than an occasional misstep; it's a pattern.

Does all the above demonstrate that Wilson himself was a racist? No. That's a high bar to meet because we don't really know much about the intentions of the man. But it raises enough doubt that even a staunch Wilson supporter such as biologist Jerry Coyne is having second thoughts (mentioned by Frazier in his May/June essay):

> This new article [i.e., Farina and Gibbons's] has substantial documentation. … This led to the revelation of a relationship that seems sufficiently unsavory and unwise on Wilson's part that I've had to revise my opinion of the man downward. … [Wilson] was a flawed man, and his flaws were less excusable than, say, the ideas of someone like Darwin since Wilson lived in our era, and that's that. … What do I think of Wilson after these new revelations, which are definitely NOT a hit job? I think less of him as a person. … He was wrong (and foolish) to support Rushton's ideas, he was wrong to sponsor papers by Rushton, and he was not sufficiently critical of Rushton's obsessive racism at a time he should have been. (Coyne 2022)

Wilson's longtime collaborator, Bert Hölldobler, has since published a vigorous defense of his coauthor and friend, partly quoted in a second piece by Ken Frazier (SI, July/August 2022, 8), stating: "It is clear to me that Ed could not have paid much scrutiny to Rushton's work but rather was motivated by the impression he got from Rushton's own description of his plight, namely, that he was being persecuted by far-left wing ideologues." Well, at the very least this is a strong indictment of Wilson's naiveté (which Hölldobler readily admits), but is, in fact, a doubtful defense in light of the several other overt racists with whom Wilson entertained a correspondence over a period of years.

Eventually, the Wilson case will be settled over time once historians of science (such as Farina and Gibbons) have gone through the available material with a fine-toothed comb. At this moment, as Coyne says, at the very least there is enough evidence to revise our opinion of the man downward.

The broader and more difficult question, which McLemore rightly raised but failed to meaningfully engage in her *Scientific American* piece, is what is the relationship between a scientist's (or a philosopher's or, for that matter, an artist's) personal ideology and their work. Of particular interest, of course, are instances where there is reason to believe that the work was, in fact, influenced by the author's ideology.

Eventually, the Wilson case will be settled over time once historians of science have gone through the available material with a fine-toothed comb.

In Wilson's case, this has been a persistent question throughout his career. Two of the great evolutionary biologists of the twentieth century, Stephen Jay Gould and Richard Lewontin (who, incidentally, was both Coyne's mentor and the chief inspiration of my own career as a biologist) had harsh things to say about Wilson's science when it came to its application to humans, a science that they saw as inextricably bound to questionable ideological positions. Dawkins attempted to dismiss Gould and Lewontin by saying that the two "stirred up" trouble for Wilson by gathering "a flock of sheep-like comrades and fellow travelers." But that's nothing other than poisoning the well, an elementary logical fallacy. And Dawkins really ought to know better.

In the end, I don't think there is a general answer available to the question of how science and ideology are intertwined at a personal level. Often, the two can reasonably be treated as orthogonal to each other. At other times, the connections will be obvious. Rushton's work was utterly driven by his racism, and consequently it collapsed upon even superficial scrutiny. By contrast, William Shockley's Nobel Prize–winning discovery of the transistor effect in physics holds up spectacularly despite the author's abhorrent racial views. Somewhere in the middle, is the case of Darwin. While it isn't fair to dismiss his work as sexist, it is opportune to note the ways in which his unquestioned (until recently) Victorian assumptions about sex and gender roles influenced his work on the theory of sexual selection in ways that still, to some extent, bias evolutionary thinking to this day. And so on, case by case.

As far as Wilson is concerned, the jury is largely still out. As the Italian writer Alessandro Manzoni once said, "*ai posteri l'ardua sentenza*," the difficult verdict is for posterity to hand out. ■

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E.O. Wilson's collaborator and coauthor, biology professor Bert Hölldobler, responds to this column elsewhere in this issue, on page 63.—Editor

[REALITY IS THE BEST MEDICINE HARRIET HALL

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An Explanation for Gulf War Illness

When Iraq invaded Kuwait in 1990, a coalition of thirty-nine countries responded. A total of 382 American troops died. Those who survived deployments to the 1990–1991 Gulf War theater of operations and returned to the United States may have been safe from combat, but they were not "safe and sound." Thirty-seven percent of them were suffering from a strange constellation of symptoms not seen in other locations or after previous wars. Around 250,000 individuals reported developing a chronic multisystem illness that was medically unexplained and persisted for years with little improvement.

They reported symptoms including fatigue, headache, memory problems, muscle/joint pain, diarrhea, dyspepsia/indigestion, neurological problems, skin conditions, respiratory problems, and more. Previously known as Gulf War Syndrome, Gulf War Illness (GWI) cases have been difficult to classify. Two definitions have emerged: the Kansas definition and the CDC definition. The Kansas definition considers six symptom groups: fatigue and sleep problems, pain, neurologic and mood, gastrointestinal, respiratory symptoms, and skin symptoms. To qualify, patients must have symptoms in at least three of these categories that had developed during or after deploying to the Gulf War, and other conditions must be excluded. The CDC definition takes a symptom-category approach with three categories: fatigue, mood-cognition, and musculoskeletal. It requires symptoms in two of the three categories lasting six months or longer, and it includes a determination of severity. The Kansas definition is more specific and may be more appropriate for research settings, while the CDC definition is broader and may be more useful for clinical purposes.

Armchair speculation was quick to propose many hypothetical causes of GWI, some more plausible than others. Most of these failed to pan out. Some of the candidates included multiple vaccinations (anthrax, botulinum toxin, etc.) administered simultaneously, depleted uranium munitions, oil and smoke from burning oil wells, swarms of insects requiring the use of insecticides, sand/particulates, tent heater exhaust, physiological stressors, organophosphate insect repellents, solvents, burn pits, chronic inflammation, combat stress, and chemical agent resistant coating (CARC). Some of these were easily ruled out; for instance, firefighters exposed to smoke from burning oil wells alone did not develop GWI.

In 2006, a committee report from the Institute of Medicine (IOM) rejected claims that GWI was not real. GWI symptoms didn't fit well with alternatively proposed psychological diagnoses, and the IOM found a consistent association with both the nerve gas antidote pyridostigmine bromide pills that troops were given and pesticide exposure. They couldn't rule out multiple exposures and synergism.

The most promising candidates remained those identified by the IOM committee—pyridostigmine pills and pesticides—until May 11, 2022, when there was a remarkable new development.

I usually rely on medical journals for groundbreaking news, but this time I first saw the news on the front page of a free military newspaper my husband picked up at the U.S. Army base where we get our health care. The May 19, 2022, issue of *The Ranger* reported that the true cause of Gulf War Illness had finally been discovered. Apparently, the reporter, J.M. Simpson, was not entirely convinced: his front-page headline had a question mark. It read "Cause of Gulf War Illness Discovered?"

The study, by Robert Haley and colleagues, was done at the University of Texas Southwestern Medical Center and was published in *Environmental Health Perspectives* on May 11, 2022, only a week earlier. Its not-so-catchy title was "Evaluation of a Gene–Environment Interaction of *PON1* and Low-Level Nerve Agent Exposure with Gulf War Illness: A Prevalence Case–Control Study Drawn from the U.S. Military Health Survey's National Population Sample." To summarize its findings: American soldiers were exposed to sarin gas, and those who had a weaker variant of a gene that helps digest pesticides were nine times as likely to develop symptoms of GWI (Haley et al. 2022).

The alarm bells rang on my irony meter. It was common knowledge that Saddam Hussein had weapons of mass destruction (WMDs)—and had used them against Iraqi civilians. When they failed to find WMDs in Iraq, faulty intelligence got the blame. But it turned out Saddam Hussein *did* have WMDs and had them ready to deliver, although he did not actually use them in the Gulf War. American forces found Iraqi bunkers full of tons of sarin and mustard gas and blew them up. It was not the Iraqi WMDs themselves but American weapons that released these chemical weapons into the air where they could harm American soldiers. You might say we did it to ourselves.

Professor Randall Parrish, in the United Kingdom, said:

> I think this is a great example of an issue that has required a long-term effort to solve, but which only a few scientists have persisted in—others giving up and assuming it is either not a real illness or too complex to solve, and funding agencies not

> wanting to wade too deeply in the politics of it. (Hawley 2022)

The Veterans Administration (VA) recognizes GWI and offers disability compensation and other benefits to eligible veterans (U.S. Department of Veterans Affairs n.d.). But the VA has (improperly?) denied more than 80 percent of Gulf War Illness claims (Goldstein 2021).

Louis Jones Jr., a former soldier and decorated Gulf War veteran, used Gulf War Illness as a legal defense in his trial for the murder of Tracie McBride. His attorney argued that he had brain damage from GWI and should be spared the death penalty and have his sentence commuted to life in prison. He was convicted of kidnapping McBride, raping her, and beating her to death with a tire iron. His appeals went all the way to the U.S. Supreme Court but were unsuccessful. He was executed by lethal injection at a U.S. penitentiary in 2003.

GWI Treatment

There is no standard treatment for GWI; the symptoms tend to last for years or decades despite treatment. A wide variety of treatments have been tried, with some interventions initially showing promise for some GWI symptoms. These have included acupuncture, integrative medicine, CoQ10, L-carnosine, nasal irrigation, mifepristone, direct electrical nerve stimulation, repurposing FDA-approved pharmaceuticals, and dietary protocols and/or nutraceuticals. Many studies are ongoing. In 2008, a federal advisory committee reviewed 1,840 published studies; their 454-page report found that "Gulf War illness is real," that GWI is a distinct physical condition, and that it is not psychological in nature (Research Advisory Committee on Gulf War Veterans' Illnesses 2008).

A 2020 systematic review concluded:

> There is moderate-strength evidence of benefit from CBT (Cognitive Behavioral Therapy) and exercise, and low-strength evidence of benefit from 2 distinct mindfulness-based interventions as well as CPAP (Continuous Positive Airway Pressure). Doxycycline was ineffective and associated with harms (moderate-strength evidence). Emerging evidence examines a wide array of treatments. Larger, more rigorous studies are needed. (U.S. Department of Veterans Affairs 2020)

In 2013, an Institute of Medicine committee concluded:

> On the basis of the evidence reviewed, the committee cannot recommend any specific therapy as a set treatment for [Gulf War] veterans who have chronic multisystem illness (CMI). The committee believes that a 'one-size-fits-all' approach is not effective for managing [Gulf War] veterans who have CMI and that individualized health care management plans are necessary. (Institute of Medicine 2013)

New Study Implications

Ideally, we would like to have reliable data on quantitative exposure to sarin gas. We know that soldiers were exposed to sarin when a bunker housing chemical agents was destroyed at the Khamisiyah Ammunition Storage Depot in southern Iraq. A mushroom cloud was observed, and a plume of contaminants was tracked over a twenty-five-mile radius; chemical weapons alarms went off on this and several other occasions, triggered by sensors in the M93A1/M93A1P1 Fox NBC (nuclear, biological, and chemical) Reconnaissance Vehicle. In the absence of reliable quantitative data, the researchers had to rely on veterans' memories of hearing nerve agent alarms during deployment. They made an effort to verify those memories by consulting military records as to whether the veteran's unit had been deployed in an area known to have been exposed to the Khamisiyah plume.

This new study promises to solve a thirty-year mystery. Does it? In the opinion of the two scientists who wrote the accompanying "Invited Perspective" article, "the authors' exploration of a gene–environment interaction between presumed nerve agent exposure and the PON1 gene offers some strong arguments that there is a true causal effect at work" (Weisskopf and Sullivan 2022). And it offers a very credible explanation of why some individuals developed GWI while others did not. The *paraoxonase-1* (PON1) gene is a known genetic determinant of susceptibility to organophosphate cholinesterase-inhibiting chemicals, such as nerve agents. There are only two catalytic enzymes that hydrolyze and inactivate organophosphates. The researchers found a strong correlation between the level of the activity of one of these enzymes and the risk of developing GWI. Those who had the weaker gene were nine times as likely to develop symptoms. This is a very satisfying explanation, but it will require confirmation by other studies and may not be the final answer. We may well discover other interacting factors that increase or decrease risk. We can hope that this new knowledge—a great example of science in action—will spur further research that may lead to effective treatments for GWI. ■

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[BEHAVIOR & BELIEF STUART VYSE

Stuart Vyse is a psychologist and author of *Believing in Magic: The Psychology of Superstition*, which won the William James Book Award of the American Psychological Association. He is a fellow of the Committee for Skeptical Inquiry.

Is Autism Really a Spectrum?

Back in the late 1970s and early 1980s, I worked at a residential facility for children with severe autism. These kids had been rejected from many other schools because, if left on their own, they banged their heads against hard objects until their skin split open, bit themselves and others, and attacked staff members and other students. Many of the children were unable to communicate with spoken language and, as a result, used sign language or picture cards to convey their needs. It was very challenging work but also very rewarding. An experience I will never forget.

Today, you would be perfectly accurate in saying my former students were "on the spectrum." Yet it is my impression that, in everyday conversation, that phrase is most often applied to people who possess all the most important abilities my former students lacked. Prior to the introduction of the spectrum concept, many of the people we most often hear from about autism might have been diagnosed with Asperger's disorder. These people at the less severe end of the autism spectrum face important challenges, but many of them will be able to hold jobs and live independently. In contrast, a large proportion of my former students never went on to live independently and required substantial support for the rest of their lives. Yet according to the current view of the American Psychiatric Association, both groups suffer from what's termed *autism spectrum disorder* (American Psychiatric Association 2013).

A Brief History of Autism Diagnosis

Before there was schizophrenia, there was dementia praecox, or early dementia. But in 1908, the Swiss psychiatrist Eugen Bleuler introduced the concept of schizophrenia. Bleuler's term was derived from the Greek words *schizo* (split) and *phrene* (mind). He chose this term because he believed the disorder

involved the splitting of several psychological functions, resulting in the loss of unity of the personality (Fusar-Poli and Politi 2008; Hoenig 1983; Kyziridis 2005). Of course, this framing led to endless confusion with "split personality," a very different condition previously called multiple personality disorder and now known as dissociative identity disorder (American Psychiatric Association 2013). As part of his effort to describe schizophrenia, Bleuler introduced the "four A's": loosening of *associations*, disturbances of *affectivity* (emotion), *ambivalence*, and *autism* (Fusar-Poli and Politi 2008). The term *autism* was derived from the Greek word *auto*, meaning "self," and was meant to describe an inward focus on oneself.

Leo Kanner (1894–1981), the first person to identify autism as a childhood disorder. (Source: Wikimedia)

In 1930, Austrian psychiatrist Leo Kanner opened the first psychiatric clinic devoted solely to children at Johns Hopkins University, and in 1943 he first identified the disorder of autism, borrowing one of Bleuler's "A's" (Adler et al. 2014). Kanner observed that there were some important differences between schizophrenia and autism. For example, schizophrenia usually involved a substantial period of normal development followed by an onset of symptoms between the ages of sixteen and thirty (National Institute of Mental Health n.d.); whereas autism was a developmental disorder starting from birth or in very early childhood. In addition, many people with schizophrenia showed a degree of recovery later in life that was not observed in autism. In the 1960s, British child psychiatrist Michael Rutter identified several other features of autism, including a relatively high incidence of epilepsy and a greater likelihood of intellectual and language delays (Wolff 2004). More recently, brain imaging studies have shown structural differences between the brains of people with autism and schizophrenia.

The *Diagnostic and Statistical Manual of Mental Disorders* (*DSM*) is the American Psychiatric Association's catalogue of recognized psychological conditions, and autism did not make it into the book until the third edition, published in 1980 (*DSM-III*; Adler et al. 2014). In addition, the *DSM-III* included a second category, pervasive developmental disorder not otherwise specified (PDD NOS), intended to capture cases that did not quite fit the typical autism diagnosis. For example, it would be applied if the onset of the disorder was later than typical for autism. Unfortunately, this category ended up being rather confusing and became even more so in subsequent editions of the *DSM*.

Meanwhile, back in 1944, another Austrian physician, Hans Asperger, had published a report about a different group of patients who showed some characteristics of autism. In contrast to Kanner's patients, these children were excessively verbal, but they talked about a very narrow range of subjects. When focused on their preferred topics, they were like "little professors," but they also failed to recognize important nonverbal social cues. Asperger's work failed to get much attention in the English-speaking world until British psychiatrist Lorna Wing published a review in 1981 (Adler et al. 2014). Wing would go on to be responsible for two important developments in autism diagnosis: the recognition of Asperger's disorder and the

Hans Asperger (1906–1980), the first person to identify the disorder that bears his name. (Source: Wikimedia)

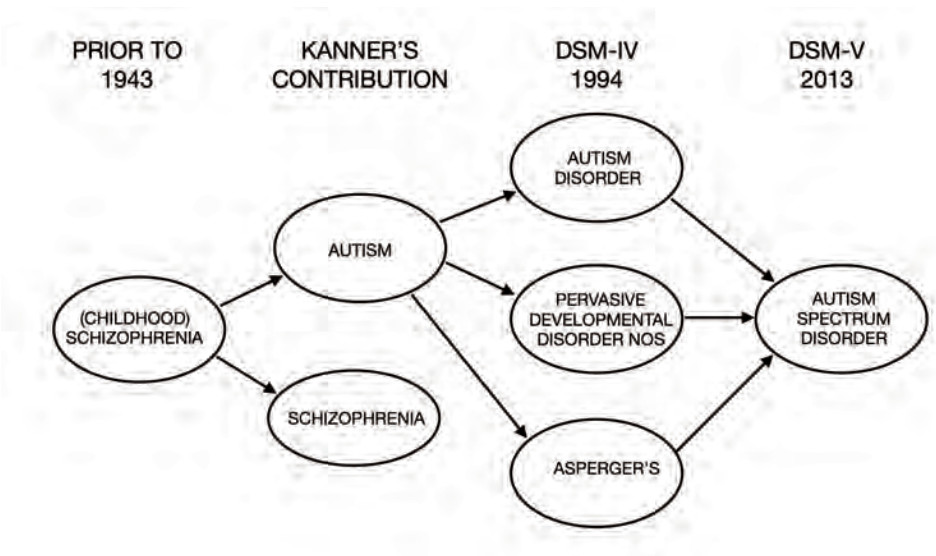


Figure 1. A simplified schematic diagram of the progression of autism and autism-related diagnoses. (Source: author)

adoption of the spectrum concept.

When the fourth edition of the *Diagnostic and Statistical Manual* (*DSM-IV*) came out in 2000, it included separate diagnoses for autism disorder, pervasive developmental disorder not otherwise specified, and Asperger's disorder,[1] but now there was real confusion about where one condition started and another began. Furthermore, although correlation is not causation, these expanding definitions for autism and autism-related diagnoses were coincident with the increasing rates of autism, sometimes called the "autism epidemic" (Adler et al. 2014).

Finally, we arrive at the current view of autism officially introduced in the American Psychiatric Association's 2013 edition of *DSM-5*.[2] Largely due to Lorna Wing's influence, the spectrum became the official theory of autism (Wolff 2004). In *DSM-5*, the three previous diagnoses were all collapsed into the new term *autism spectrum disorder* (ASD), completing the progression shown in Figure 1. This change produced several effects, but one of the most important of these was the worry that all the children who fell under the big umbrella of ASD might have different needs. Writing in the *Maternal and Child Health Journal* in March 2013, Roy Grant and Molly Nozyce expressed the concern that "This change may have unintended consequences, including the possibility that the new diagnostic framework will adversely affect access to developmental interventions" (Grant and Nozyce 2013, 586).

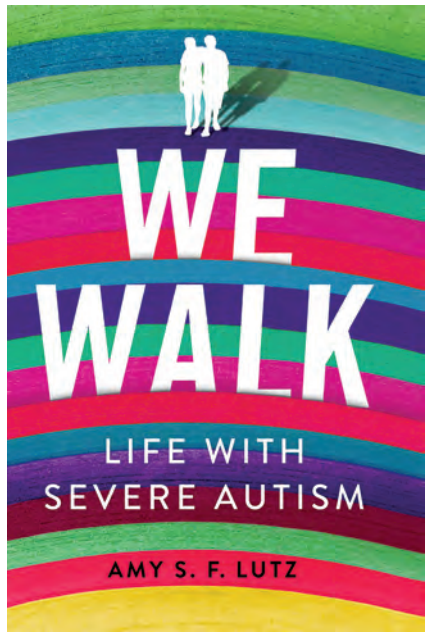
A more specific worry about the spectrum approach has been that children and adults at the severe end would be lost in the shuffle. There are still many individuals like my former students who will require substantial support throughout their lives. Their needs are quite different from those of people formerly diagnosed with Asperger's disorder and other forms of autism. In response to this concern, a group of parents and professionals have recently formed the National Council on Severe Autism (NCSA; www.ncsautism.org). It is clear from a position statement on their website that they believe the spectrum has not served people with severe autism well: "The broadening of the construct of autism in the form of the *Diagnostic and Statistical Manual (DSM-5)* criteria for Autism Spectrum Disorder (ASD) in 2013, while well-intentioned, has had the effect of rendering the diagnosis essentially meaningless, as it allows for the same diagnosis to be given to wholly disparate individuals" (National Council on Severe Autism n.d.a).

In addition, the NCSA has objected to vocal activists on the opposite end of the spectrum who argue that autism is a mere "condition" and not a "disorder" and that people do not "suffer" from autism but just "experience" it (National Council on Severe Autism n.d.b). Today, many of the most outspoken autism advocates are people at the less severe end of the spectrum who have the gift of speech and may never have encountered anyone with severe autism.

A Parent's View

Amy Lutz is the author of the 2020 book *We Walk: Life with Severe Autism* (Lutz 2020), a beautifully written collection of essays about her life with Jonah, the oldest of her five children. Lutz is also vice president of the National Council on Severe Autism. To get a parent's perspective, I asked her to comment for Skeptical Inquirer on her view of the spectrum concept.

> I don't have any issues with the spectrum concept of autism per se; what has really harmed severely autistic individuals like my son Jonah is the use of a single word to describe everyone on the entire spectrum.



> Before the introduction of *DSM-5*, very mildly affected autistic individuals were typically labeled with Asperger syndrome, while those of moderate functioning often received the diagnosis of PDD NOS. It was only those who were significantly disabled by their condition that received the diagnosis of autistic disorder. *DSM-5* eliminated these diagnoses, so now everyone—from law school graduates to individuals who spend their lives in diapers and helmets (to keep them from killing themselves when they compulsively smash their heads against the floor)—receives the same diagnosis of autism spectrum disorder. Furthermore, because of this conflation, many individuals in the former group now claim the authority to speak for those in the latter, even if they have never met.

To further explore her view of the spectrum, I asked Lutz whether, in her opinion, people at opposite ends of the spectrum are more properly considered *quantitatively* different or *qualitatively* different.

> I really like this question, because it gets to the heart of the vitriolic debates that divide the autism community. The differences between individuals on the two ends of the spectrum are undeniably qualitative, not quantitative. It is not about being more or less social, or more or less communicative. To me, it boils down to the lack of abstract concepts that informs Jonah's way of processing

to the lack of abstract concepts that informs Jonah's way of processing the world. He simply has no conception of life and death, past and future—never mind identity politics, autonomy, or Disability Rights. This is also why he needs qualitatively different supports than someone who is high functioning. Someone who might have been described as an "Aspie" before 2013 may have no need for specialized classrooms, sub minimum wage employment, or large, intensive, specialized residential settings. But these are essential for some individuals on the severe end of the spectrum to live their best lives, and the current trend of de-funding or eliminating them because some neurodiversity advocates consider them too "segregating" or "isolating" will only harm those most disabled by autism.

In the introduction to the *DSM-5*, the American Psychiatric Association authors wrote that "As the understanding of mental disorders and their treatments has evolved, medical, scientific, and clinical professionals have focused on the characteristics of specific disorders and their implications for treatment and research" (American Psychiatric Association 2013, 5). It seems clear to me that, at least for people with severe forms of autism, the introduction of autism spectrum disorder had implications that were not anticipated. The spectrum has not helped; it has instead fostered confusion and contributed to a lack of understanding of the needs of people with different forms of autism. It may have been intellectually satisfying to unify several disparate disorders under one umbrella term, but if the umbrella covers up important differences, it loses its usefulness. For the sake of Jonah, my former students, and others like them, I hope a better diagnostic system can be found soon. ■

Notes

1. For simplicity's sake, I've omitted Rett syndrome and a few other autism-related disorders. The three mentioned here are the most common forms of autism.

2. Roman numerals were discarded with *DSM-5*.

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[THE PRACTICAL SKEPTIC MICK WEST

Mick West is a writer, investigator, and debunker who enjoys looking into the evidence behind conspiracy theories and strange phenomena and then explaining what is actually going on. He runs the Metabunk forum, tweets @mickwest, and is the author of the book *Escaping the Rabbit Hole*.

Skeptical Recurrence and Decay

George Santayana's aphorism "Those who cannot remember the past are condemned to repeat it" is familiar to many, but we all inevitably fail at some point to live up to its advice. The problem with the past is that there's just so much of it, and most of us have our hands full simply dealing with the present.

This inevitable forgetting and renewing leads to a somewhat cyclic aspect of the field of skepticism that could perhaps benefit from some consideration. I've been actively investigating many topics for nearly twenty years and so have had the chance to observe new generations both embracing conspiracy theories (and pseudoscience) and attempting to debunk those beliefs. Many of these people were not even born when I first wrote about these topics. Why do things repeat after already being debunked? I will both illustrate the issue and provide pointers for what we might do to improve the situation. The two aspects of this situation are *recurrence* (which applies mostly to the bunk) and *decay* (which applies more to skepticism and debunking).

Skeptical Recurrence

Skeptical recurrence happens on various scales. At the simplest we have claims of evidence that—despite having been fully debunked by skeptical analysis—are repeated as if they are something new. Literally every day, someone will point out that supposed chemtrails differ from airplane contrails in the way they persist behind planes—despite mountains of evidence, and scores of articles, clearly demonstrating and explaining that they in fact do not.

On a larger (and longer) scale, recurrence is the ebb and flow of a theory in the public consciousness. Some of this recurrence comes from anniversaries. The 9/11 conspiracy theories get a fresh boost of interest every September 11—much the same way that JFK theories are renewed every November 22. Chemtrails have an annual cycle based on the seasons, because suspicion-creating airplane contrails are more common in the winter months.

But the longest cycle of recurrence comes after many years, when a conspiracy theory goes through a form of rebirth. Fresh life is breathed into old ideas, both from new generations bringing in new ideas and from the same old ideas springing back to life—freed up by our forgetting the past and unrestrained because of the next aspect: decay.

Skeptical Decay

Practical human knowledge now largely lives on the internet. Sure, there are books and journals that contain an incredible wealth of information. But the actual sources of information that people consume comes from the internet. There are many sources of bunk out there in the form of websites that spread disinformation. Over time, skeptical websites arise in opposition. There are general purpose sites such as Snopes and Factcheck.org. There are more specific sites such as CFI's Quackwatch (with a focus on medical misinformation). Then there are very specific sites such as Moon Base Clavius, which looks only at claims that the Moon landings were faked.

While a website can simply be a series of articles within a repository of information, the power of the internet has always been in hyperlinks—references that you can click on that take you directly to a key piece of supporting information. The problem here is that websites decay, and sometimes they die.

The most common form of site decay is known as *link rot*. When first written and published online, the references and links therein all presumably work (assuming the author and editors have done their jobs). But the author has no control over whether a given link continues to work in the future. Links can be broken for many reasons, such as by the target site reorganizing its internal layout. More often, the site simply goes offline.

For example, in Quackwatch's article on acupuncture (which I picked simply because it was the first topic alphabetically), there are thirty references (see http://tiny.cc/q7lsuz). Most (twenty-three) of them have a hyperlink to the reference in question, but of these nine are broken. The links now take you to 404 error pages or even to totally different websites. Despite the rigorous academic nature of the article, it suffers from significant link rot.

How Decay Allows Recurrence

The Quackwatch article is of course still valuable, and the bulk of the information is in the page's text. The broken links still contain the name of the reference, which the reader can still track down the old-fashioned way (and only a very small percentage of people click on the references anyway). While not ideal, it still works.

The more harmful form of rot is when an entire site ceases to work, especially if it is a key resource for debunking false claims. This is especially problematic when the bunk is still being actively

promoted by well-financed organizations. One such site was debunking911.com—a great resource that clearly explained and illustrated many of the misconceptions surrounding 9/11 and the associated "controlled demolition" conspiracy theory. Started in 2006 (during the peak of 9/11 conspiracy speculation), the site existed until 2019, when it suddenly vanished, and all the neat little articles vanished into the ether.

Why did it die? Like many single-subject skeptical sites (such as my own Contrail Science), it was run by one person. When that person either lost interest or had a change in life circumstances, they stopped paying the hosting fees, and the site simply expired at the end of the billing cycle. The files were wiped from the server, and the domain was snapped up by spam purveyors. Single-owner skeptical sites are inherently vulnerable to this extreme form of decay. And often with these more esoteric topics, the single-owner sites (with their dedicated and focused creators) are the best we have. When the disinformation sites start to outlive the debunking sites, then we have a problem.

Recurrence of 9/11 Truth

As debunking911.com vanished into entropy, the most popular 9/11 conspiracy-promoting site experienced something of a rebirth. Also founded in 2006, Architects and Engineers for 9/11 Truth (AE911Truth) was a product of the complexity of the collapses of the Twin Towers. Faced with the monstrous images of the top portions of the buildings plowing through the lower portions in a highly energetic manner, many people, including engineers, had difficulty understanding what had happened.

Into that void stepped AE911Truth. Founded by Richard Gage, it built upon ludicrous theories (one million explosive ceiling tiles being a memorable one) that were found on older sites, mostly rotted away. Gage's site has survived because it is both an organization run by multiple people and because it is well funded by donations from individuals. In 2019, AE911Truth reported $784,710 in income. Fighting the inevitable decay in interest in 9/11 theories, AE911Truth has used its money and organizational structure to keep itself fresh. They reworked their website, added an "educational" series of videos, organized outreach to architects and engineers at their conferences, started a podcast, and created a series of memes.

Their ultimate act of renewal was to fire their creator, Richard Gage. Gage, obviously, was a conspiracy theorist. But during the pandemic he spoke about how he thought the vaccine was a plot by George Soros (a favorite anti-Semitic target) and how Bill Gates was a eugenicist intent on decimating the world's population.

This taint scuppered the inclusion of AE911Truth in a Spike Lee documentary—something that would have been great for their image and credibility. The board recognized that Gage was a distraction and asked him to move on. He was then free to pursue his interests in vaccine crimes and chemtrails. AE911Truth, meanwhile, started work on a new movie that would once and for all address debunkers' claims. They illustrated the movie with an image of air being expelled from the building as it collapsed. This was a recurrence of something that they had, often successfully, used as evidence that explosives were used. But it was also something that was neatly explained by debunking911.com, now decayed, dead, and gone.

Fighting Decay and Recurrence

In *Thus Spake Zarathustra*, Neitchze discusses the concept of "eternal recurrence" as a motivating force. If somehow we knew we had to live our lives over and over again, then should we not make that life the best life possible? The knowledge of recurrence should inspire us to greatness. Unlike Neitchze's rather dubious notion of recurrence by cyclic reincarnation, the recurrence of conspiracy theories is something that we know happens and is largely inevitable. But we can still use it as a motivating force, perhaps even a call to arms.

There are simple practical steps we can take. To combat link decay we should attempt to use links that cannot be broken. The simplest way to do this is to use a mirror link to a site such as the Wayback Machine, a.k.a. archive.org. This is a well-funded copy, or *mirror*, of the entire internet, storing current and past versions of web pages going back over two decades. It's likely to be very stable. If I get hit by a bus, then all the links to Contrail Science will probably stop working in less than a year, but links to the same page on archive.org will work for decades to come.

Archive.org links tend to be quite long, so as a practical matter it's best to use a URL shortener. These take a long URL and create a very short working link. Unfortunately, this introduces another point of failure: if the link shortener site expires, then *all* the short links are broken. So it's important to use a site that participates in the Internet Archive's 301Works project (https://archive.org/details/301works), which ensures that the links will continue to work, even if the shortening company goes bankrupt.

With the more significant issue of the full decay and death of a site (like debunking911.com), we could in theory just link to the site's home page on archive.org. But it's not that simple. Older sites are often not fully indexed, and debunking911.com on archive.org had many missing images. Luckily I'd made a copy of it the year before it went down and was able to create a working mirror (https://www.metabunk.org/mirror/www.debunking911.com/).

Sadly, the existence of a mirror does not automatically fix all the links that get broken when a site expires. So at a broader level, we should try to preserve and refresh useful resources in their original location whenever possible. Ideally, we should eliminate the significant "bus accident factor" inherent in single-owner sites by bringing ailing sites under the support of a well-funded and well-structured organization that can keep them alive as long as they are needed.

The unfortunate inevitability of conspiracy recurrence makes fighting skeptical decay not just a good idea but a necessity. Recurrence will happen if the next generation has no memory of a conspiracy, so we must remember it for them. ■

[SKEPTICAL INQUIREE BENJAMIN RADFORD

Benjamin Radford is a research fellow at the Committee for Skeptical Inquiry and author or coauthor of thirteen books, including *Big—If True: Adventures in Oddity*.

Debunking 'Weapons of Mass Distraction' Conspiracies

Q: **Don't you think that [insert most recent news story] is just a planned distraction from the real issues so we don't talk about [insert favored "real issue"]?**

—L. Waise et al.

A: As a regular consumer of social media, I've routinely come across this question, usually framed as a quasi-conspiracy. The basic premise is that, for those who have a favored cultural, social, or political agenda (i.e., most people), anything that they think is being talked about too much on news or social media is (or might be) a planned distraction, a manufactured news event introduced into the news cycle by powerful media elites to draw attention away from their pet causes. It's an interesting question from media literacy and critical thinking angles, and it's hard to pin down falsifiable specifics. What's being promoted is more of an endorsement of general media distrust. Like most conspiracies, it is ironically framed as skepticism.

The roots of this claim date back at least centuries and would be at home in the 1532 book *The Prince*, in which Niccolò Machiavelli offers insight into ambition, power, political exploitation, and more. The basic principle ("No, I didn't steal anything—but, hey, what's that over there?") is hardly groundbreaking.

There are similarities to false-flag conspiracies, in which events are allegedly staged to offer a pretext for some action that might otherwise attract condemnation or alarm—from gun control measures to administering vaccines that can somehow track people.

Mass shootings, and school shootings in particular, have been routinely cast by conspiracy theorists as staged "false flag" events designed to provide an excuse for the government to declare martial law and confiscate guns from law-abiding citizens (which of course never happened). The idea fundamentally signals concerns about the seizure of power or authority under false pretenses and about the use of media to manufacture consensus.

In distraction conspiracies, the events underlying them may or may not be legitimate, "real," or what they seem. The key is that they are manufactured as a way to get the public angry—or at least talking—about some potentially competing event, however unrelated, that "They" might want the public to pay close attention to.

The Trump Effect

During Donald Trump's presidency, critics claimed he often said and did things with the specific goal of distracting the public and news media from something else he wanted to keep hidden. The claims have circulated for years, especially on social media. For example, one Facebook post stated that "Trump's quixotic attacks on immigrant children, Denmark, and American Jews are horrible, but even though we can't ignore them, they are obviously meant to distract." It wasn't clear what Trump's statements and actions were "obviously" meant to distract *from*. While not a formal conspiracy theory, the claim demonstrates classic conspiracy thinking: there must be some hidden agenda, some "real" reason something happens. In this case, why else would Trump crack down on immigrants, pick a fight with Denmark, and opine that American Jews who didn't support him were "disloyal"?

The claim essentially posits or assumes a correlation between Trump's often wild, news-making statements and actions and the existence of some potentially unsavory act or news story that does (or might potentially) involve Trump in some way. The claim is typically stated as a self-evident matter of fact, that "obviously" some devious (if transparent) distraction tactic is afoot.

Trump's statements were notable for many reasons, chief among them that 1) they reflected formal, official positions by the United States government; 2) they were often factually and demonstrably false, misleading, or exaggerated; or 3) they were bizarre, non-sequitur,

and/or petty personal attacks. The sheer number of statements by Trump represented a huge pool of statements that could potentially be seen as having been issued as part of some distraction strategy. Against this backdrop, we have the second part of the equation: events and issues that are potentially (personally or politically) embarrassing or damaging to Trump. Once again, we find a deep well of material. What the "distraction tactic" theorists are asking us to do is connect one or more of Trump's thousands of statements (Which ones? Take your pick.) with one or more of Trump's hundreds of real, apparent, or potential scandals (Which ones? Take your pick.) and see that the former is being used to somehow distract from the latter.

Conservatives often rail against "cancel culture" and point to beloved icons such as Dr. Seuss as being under attack. However, whether such real or feigned outrage is, as one commenter noted, "a distraction so we don't focus on the various states moving to take away the voting rights of black people, indigenous people, and POC" is another matter. It's not clear that these controversies are really an organized Republican attempt to "distract" the public away from social justice issues.

Seeing hidden connections and causes is the common logical fallacy *post hoc ergo propter hoc* (Latin for "after this, therefore because of this"). Because the human mind seeks connections, people often misattribute causes, thinking that "B happened after A did, so A must have caused B." It makes sense, and it's sometimes true—but not always.

The "weapons of mass distraction" claims are difficult to disprove. The fact that Trump did or said something newsworthy (or outrageous) at the same time that some real or potential scandal loomed over him is meaningless, because he has *always* been mired in scandal. Anything he says or does can be plausibly contrasted with some other contemporaneous issue he might conceivably want to distract from. Similarly, there will always be some news story that someone thinks does not merit the attention and coverage it's getting on news and social media and must therefore be sucking up the digital oxygen that their pet cause or news story *should* be getting. Why? Maybe there's some hidden hand pulling strings.

A Closer Look

If this weapons of mass distraction campaign is real, it has generally failed. Journalists tend to be a pretty savvy lot, and news organizations can cover more than one story at a time. The idea that there is a single spotlight that "the news media" train on a specific topic to the exclusion of other news stories is false. It's true that a single reporter can usually work on only one story at a time—but that's why newsrooms employ more than one reporter, in some cases dozens of them. Even if a reporter at a given organization is temporarily being tied up on some red herring "distraction" issue, there are many others who are working on reporting whatever topics are presumably being distracted from; it's not an either/or proposition.

In the case of Figure 1, class wars are hardly being "distracted from" (much less successfully so). They are instead common themes in both news and social media and have been for years; witness the countless popular complaints,

Figure 1. Internet meme circulating in 2021 depicting the weapons of mass distraction conspiracy. Artist Credit: @saddrawingsbyjace - Instagram

ranging from the 2011 Occupy Wall Street protests to the 2022 rafts of social media memes criticizing billionaires. If there really is a powerful cabal of media owners and billionaires making a sustained concerted effort to distract the general public away from class wars and economic inequality, it has been a spectacular and self-evident failure.

Just like news media, people can and do pay attention to more than one thing at a time. The American attention span may have shrunk in the digital age—and there are countless news events that could potentially vie for clicks, attention, funding, and screentime—but that doesn't logically mean that any given newsworthy event is created or covered as a means of public distraction. People can (and do) talk and care about multiple things at once. They can be deeply passionate about social justice and also chat with friends about celebrity news.

This is not to say that politicians and others never try to bury bad news behind even worse news or hope to distract or diminish the public's attention. It's a well-known tactic, and one reason press offices often release bad news on Fridays. There was even an infamous case of a British government advisor who suggested that the days after the September 11, 2001, attacks would be a good time to issue unpopular statements because the attacks would dominate the news coverage. This, of course, was not a case of a person or government creating an intentional "distraction" from something else it was involved in.

As with many conspiracies, there's a grain of truth to it: It's possible, even likely, that Trump at some point said something outrageous solely for the purpose of distracting from some other story or that a news director at some organization diverted journalistic resources to one story over another to help distract from some competing story. But there's no evidence that it's done routinely as part of some strategy by political masterminds.

The conspiracy theory also fails to distinguish between the alleged distraction, the news media covering that distraction, and the powerful elite supposedly in control. Billionaires such as Jeff Bezos and Richard Branson undeniably have clout, yet all their money and influence didn't stop the widespread ridicule and scorn of their space launches. And of course there is no evidence that these Illuminati-lite elites are actually *creating or encouraging* these distracting events, ranging from school shootings to class warfare. Except in cases of state-controlled media such as in Russia and North Korea, the relationship between journalists and government officials is often adversarial. Pulitzers are not won by newspapers that generate (or disproportionately cover) distractions or that are afraid to challenge the powerful.

WHAT IF I TOLD YOU
@Justin Trudno
THE CANADIAN LIBERAL MEDIA IS BOMBARDING US WITH TRUMP NEWS TO DISTRACT US FROM OUR OWN GOVERNMENT'S INCOMPETENCE

One thing that's atypical about this conspiracy theory is that—like the claim that the American government wants to keep its populace uneducated (despite historically high levels of education; see my column in the January/February 2020 SI)—it is endorsed across the political spectrum. Because it's based largely in a general distrust of "the media"—though typically specific news media, such as Fox News or the (arguably nonexistent) "mainstream media" or MSM—the commonality is not politics but instead cynicism. This is especially the case for politics and news media (for more, see Bensley et al. 2022, one of Scott Lilienfeld's final contributions to skepticism).

Certainly, news organizations and partisans exaggerate and sensationalize, but Occam's razor suggests that it's largely for clicks, attention, and political points—not some master plan to distract the public away from specific issues. ■

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From Debunking to Prebunking

How Skeptical Activism Must Evolve to Meet the Growing Anti-Science Threat

Anti-science movements are rapidly expanding and evolving. Our tools, as skeptics and critical thinkers, must also evolve to meet this growing threat.

NICK TILLER

In a 1980 *Newsweek* essay, Isaac Asimov wrote, "There is a cult of ignorance in the United States, and there has always been. The strain of anti-intellectualism has been a constant thread winding its way through our political and cultural life, nurtured by the false notion that democracy means that *my ignorance is just as good as your knowledge* [emphasis added]" (Asimov 1980). With those words, Asimov drew attention to deep cultural divisions of 1980s America, divisions that have since only widened. Unwittingly, Asimov was prophesizing the destructive manifestations of misinformation, disinformation, and *pseudo*science in 2022.

Anti-science movements have been evolving for centuries: from the early sixteenth-century naivete that opposed the Scientific Revolution, to the more recent misinformed and (sometimes malevolent) beliefs of flat-earthers, climate-change denialists, and anti-vaxxers. The reach and impact of mis- and disinformation is more profound than ever, due in no small part to growth of the internet and social media, which has eroded the barriers to mass communication and contributed to the spread of scientific falsehoods (Vosoughi et al. 2018). Moreover, this rapid change in cultural dynamics has occurred faster than population critical faculties have been able to adapt.

In modern culture, mis- and disinformation are perhaps most conspicuous in false claims relating to COVID-19. For instance, we now contend with an anti-vaccine lobby that is so staunchly resistant to science that a pandemic-level respiratory virus, that has so far taken more than one million American lives, helped the movement to flourish rather than flounder. For most people, priorities amid COVID-19 shifted toward family, healthcare, and financial concerns. For others, the pandemic signaled an opportunity to exploit widespread fear and uncertainty for personal gain. Twelve individuals, the so-called "Dis-

The reach and impact of mis- and disinformation is more profound than ever, due in no small part to growth of the internet and social media.

information Dozen" or "Dirty Dozen," expertly capitalized on political divisiveness to disseminate their message using the echo chamber of social media. In doing so, they distinguished themselves among the anti-science crowd as the foremost disseminators of COVID-19 disinformation (Jarry 2021).

Skeptical activism emerged, at least in part, to challenge such malevolent messaging. In a recent article for *Scientific American*, Dr. Peter Hotez wrote:

> Antiscience has emerged as a dominant and highly lethal force, and one that threatens global security, as much as do terrorism and nuclear proliferation. We must mount a counteroffensive and build new infrastructure to combat antiscience, just as we have for these other more widely recognized and established threats. (Hotez 2021)

Indeed, scientists and science enthusiasts now find themselves in an arms race with anti-science movements to extend their reach and develop more effective messaging. It is a race we cannot afford to lose.

Myth-Busting, Debunking, and Other Tools of the Trade

The phrase *primum non-nocere* ("first, do no harm") is a well-accepted ethical duty of medical and many scientific professions. Acting in accordance with this principle means not only administering sound advice (i.e., that which is detailed, reasoned, and evidence-based); it also means striving to remove absurdity and falsehood from circulation and preventing bad science from entering the "public square" where it can contaminate decision making.

Scientists and science enthusiasts now find themselves in an arms race with anti-science movements to extend their reach and develop more effective messaging.

It is for this reason that I, like many critical thinkers, pride myself on being a "debunker of pseudoscience." *Debunking*—a term with various definitions, including "presenting a corrective message that establishes that the prior message was misinformation" (Chan et al. 2017)—has become a feature of the modern skeptical movement. Although the literature on corrective messaging is generally positive and shows beneficial effects on changing misinformed beliefs, swapping falsehoods with facts is neither easy nor guaranteed to be effective. In fact, the literature is complex and sometimes conflicted, likely owing to methodological differences among studies and the different cultural domains in which messaging has been assessed (e.g., public health, science, politics). As such, it is important to understand both the strengths and the potential limitations of debunking messages and where they may have unintended consequences.

For instance, the way in which a corrective message is delivered can influence its effectiveness. Debunking is generally less effective when misinformation is simply labeled as such (Chan et al. 2017), suggesting that more detailed corrective strategies are needed. Aimée Challenger and colleagues studied three such strategies on reducing misinformed beliefs about COVID-19: 1) Presenting the falsehood as a question with a factual answer; 2) Presenting only the fact; and 3) Presenting both the myth and the fact. Although all three strategies reduced the prevalence of COVID-19 mistruths, fact-only messaging was ineffective when myths were held more strongly (Challenger et al. 2022, 19). In fact, correcting misinformation superficially—without substantial explanation of why the misinformed belief is wrong—can inadvertently strengthen that belief (Schwarz et al. 2007). This is because changing an individual's belief not only depends on them abandoning the initial falsehood but also on them replacing the falsehood with a new model; this only occurs when the corrective message is sufficiently detailed (Johnson-Laird 1994). Corrective news stories, for example, which are not generally restricted to the word limits of social media platforms, were effective in limiting misperceptions about the Zika virus when those news stories appeared in a simulated Facebook newsfeed (Bode and Vraga 2018).

In line with these data, corrective messaging that is "rational" (e.g., highlighting the rhetorical tools used to spread the misinformation) is an effective debunking strategy. Indeed, rational arguments were shown to have a greater effect on reducing conspiratorial beliefs when compared to "ridiculing," whereas "empathizing" with the targets of conspiracy theories was ineffective (Orosz et al. 2016). Although a 2020 study showed that the tone used in corrective messages on Twitter (uncivil, affirmational, or neutral) equally reduced misperceptions (Bode et al. 2020), shaming, ridiculing, or marginalizing a flawed belief is actively discouraged (Caulfield 2020). Data across multiple social media platforms also show that correcting a misperception about an emerging health issue may be most effective if evidenced with a valid source (Vraga and Bode 2018). Intuitively, scientific jargon should be kept to a minimum because using jargon will likely cause people to disengage from the content (Shulman et al. 2020). Overall, the data show that effective debunking is usually factual, relatively detailed, and supported by evidence but also clear and "sharable," all of which make the message more memorable. As Chip and Dan Heath describe in their book *Made to Stick*, "We must fight sticky myths with stickier facts" (Heath and Heath 2007).

The perceived intelligence and competence of the messenger was shown to play a role in the message's success (Orosz et

Misinformation was spread extremely easily thanks to social media platforms during Trump's presidency, and even afterwards. Editorial Credit: Ascannio/Shutterstock.com

al. 2016), indicating that the source of the corrective message may also influence the outcome. As such, we can speculate that corrective messages are more effective when derived from authoritative figures and sources. This notion is supported by an analysis of digital media coverage of the 2017 G20 summit, showing that rumors that were debunked early and vehemently by official sources were most likely to be attenuated (Jung et al. 2020). There is a caveat, however. Corrective messaging administered by experts or expert organizations may increase media coverage of the myth and potentially increase the consumer's familiarity with it; even a single exposure to misinformation might increase subsequent perceptions of accuracy (Pennycook et al. 2018). Experts who tackle mis- and disinformation may inadvertently reinforce the myth as a genuine problem, making it more believable and helping it endure (Lewandowsky et al. 2012). Nevertheless, there is little empirical evidence that more general debunking efforts have such an outcome, and it is almost certain that the positives of expert-derived skepticism outweigh the negatives. More data are needed.

Where debunking is relatively less effective (although not completely ineffective) is in relation to the vocal science denier (e.g., a staunch anti-vaccine proponent) who holds strong ideological beliefs. According to Brendan Nyhan and Jason Reifler, "Once a belief is formed, people generate explanations that fit and further reinforce this belief and tend to vigorously reject counter-arguments that make them uncomfortable, regardless of their validity" (Nyhan and Reifler 2010). For example, a study by Mohsen Mosleh and colleagues showed that publicly debunking someone's flawed political beliefs may have "perverse downstream consequences" (Mosleh et al. 2021). They explored posts from 2,000 Twitter users who were identified as sharing false political news. When the researchers replied to these "false tweets" with links to fact-checking websites, they observed a decrease in the quality of the users' subsequent posts and an increased partisan slant and language toxicity (Mosleh et al. 2021). While this so-called "backfire effect" is generally thought to be overstated (Caulfield 2020), there is certainly evidence that people intuitively counterargue against information that tends to challenge their worldview (Lewandowsky et al. 2012).

In one of the earliest reports of this phenomenon (Lord et al. 1979), a now seminal Stanford University study presented students—who either supported or were opposed to capital punishment—with two research articles: one confirming and one disconfirming their existing beliefs about the deterrent efficacy of the death penalty. After assimilating both sets of data, proponents and opponents of capital punishment rated the results that confirmed their own beliefs to be more valid and scientifically convincing, while simultaneously dismissing the disconfirming data (i.e., exhibiting confirmation bias). The research papers, which had been artificially contrived for the purpose of the study, further polarized the preexisting beliefs. Indeed, a meta-analysis of sixty-five studies revealed that it is "more difficult to correct for misinformation in the context of politics and marketing than health" (Walter and Murphy 2018). This goes some way to explain the reluctance shown by some to conform with COVID-19–related public health messages, which have been overtly politicized (Stroebe et al. 2021), thereby becoming largely insulated from evidence.

Irrespective of its strengths and potential limitations, debunking is now celebrated in digital and social media as though it were the only tool we have against misinformed beliefs. In fact, it should be considered a single string in the skeptical bow. Misinformation persists in the memory, allowing it to influence behaviors and judgments long after attempts have been made to correct it (Johnson and Seifert 1994). As such, myth-busting alone is insufficient to guarantee good decisions regarding public health and policy. Furthermore, mis- and disinformation will likely never be extinguished. This is because falsehoods are more novel, evoke more emotive responses (e.g., fear, disgust, and surprise), and therefore diffuse "significantly farther, faster, deeper, and more broadly than the truth in all categories of information" (Vosoughi et al. 2018). Accordingly, social media platforms have little-to-no incentive to remove content that generates so much engagement. Thus, when Hotez wrote: "We must mount a counteroffensive and build new infrastructure to combat antiscience," he no doubt intended for our counteroffensive to be more nuanced and sophisticated than straightforward corrective messaging.

The Importance of Embracing Modern Tools: Defeasibility and Prebunking

Sometimes a belief is so steadfast that neither evidence nor

Debunking is now celebrated as though it were the only tool we have against misinformed beliefs, but it should be considered a single string in the skeptical bow.

logic is sufficient to oppose it, and this is where debunking and myth-busting may be less effective, and more subtle, less direct, approaches may be needed. Defeasibility theory is a mode of reasoning designed to introduce doubt into an ideological belief with the aim of weakening or overturning it in light of a new perspective (Rudinger et al. 2020). However, rather than simply challenging a belief with facts and reasoned arguments, as in debunking messages, this more subtle approach encourages people to search for factors that might undermine their position. In other words, the aim is not to change people's minds but rather embolden them (through patience, respect, and empathy) to change their own minds. At the very least, the technique encourages individuals to consider how a valid challenge to their position might appear. When Lee McIntyre (author of *How to Talk to a Science Denier*) attended the 2018 flat-earth conference, he used aspects of defeasibility theory to engage with science deniers:

> I let them speak, then followed up with questions once the dialogue was rolling. Instead of refuting arguments, I asked, "What evidence might change your mind?" If they said they needed "proof", I asked why existing evidence was insufficient. If they shared a conspiracy theory, I asked why they trusted the evidence for it. By doing that—and not monologuing the facts—I was able to let them wonder why they couldn't answer my questions. (McIntyre 2021)

Several years ago, I had a similar experience with a proponent of chiropractic. Rather than bemoaning the poor risk-to-benefit ratio and lack of plausible mechanism, I instead asked them to "consider the circumstances under which you might reform your ideas. What would 'convincing data' look like to you? Would negative testimony from friends or colleagues, or from a chiropractor, discourage you from engaging in the practice? Have you ever had a negative personal experience with chiropractic?" One outcome of a defeasibility challenge is that it reveals whether misinformed beliefs are fixed or finite. If the latter, then fact-checking and corrective messaging might be ineffective and may even evoke stronger retention of the misinformed belief (Pluviano et al. 2017).

In such circumstances, we may need to lean more heavily on preemptive strategies, so-called "prebunking," to help reduce the spread of misinformation. Inoculation theory supports the notion that individuals can be protected against persuasive attacks on their attitudes, in a similar manner to immunization against a virus (McGuire 1961). In fact, for decades psychologists have shown that exposing people to weak forms of misinformation enables them to develop immunity to its stronger manifestations (Compton 2013). For instance, an individual could be (partially) inoculated against falling for a widespread conspiracy theory (e.g., the moon landing hoax) by preemptively exposing them to weakened versions of the arguments that are likely to appear on social media. As a result, individuals develop counterarguments that improve their ability to recognize similar types of misinformation in the future. Strategies that have been explored as a means of inoculation include humor and video games (Cook 2020; Roozenbeek and van der Linden 2019), both of which make facts accessible to the mainstream and may confer cognitive "immunity" to varying degrees against the spread of misinformation. A recent meta-analysis showed that preemptive inoculation was more effective at reducing individual susceptibility to persuasive arguments when compared to corrective facts (Banas and Rains 2010).

The Future of Skepticism Must Have Critical Thinking Education Prioritized

While debunking and prebunking represent complementary skills in the skeptic's toolkit, I cannot help but feel they treat the symptoms of blunted critical faculties rather than the problem of how misinformed beliefs arise to begin with. In this respect, debunking and prebunking are analogous to "giving someone a fish" so they can stave off hunger rather than teaching them basic fishing skills so they can feed themselves in perpetuity.

The literature consistently shows that the prevalence of misinformed beliefs is greatest in people with lower conditional reasoning abilities (Dean et al. 2022). Unfortunately, these skills are scarcely taught in schools, colleges, or universities. There is a relative disregard for critical thinking in the school curriculum (Radulović and Stančić 2017), perhaps because education is considered a zero-sum game in that there is finite time and resources to teach a predetermined program. As Ben Morse at the *Guardian* newspaper wrote:

> Schools are businesses (now so more than ever, as they balance their books one playing field at a time) and the bottom line is league tables. … If a school's primary purpose is to generate pass rates and percentages into higher education (and it currently is, like it or not), then why devote staff to critical thinking? (Morse 2012)

Furthermore, in his book *The Death of Expertise*, Tom Nichols describes the "customer service university": the mid-range schools and colleges that are so desperate for new students (and their tuition fees) that course experiences take precedence over the curriculum. Universities have neither the time nor resources to teach critical thinking to produce well-rounded, mature, logical, and competent thinkers, when "bums on seats are all that matter" (Nichols 2017).

Not even a science education is sufficient to guarantee robust critical thinking skills. While most undergraduate science programs teach classes in research methods and ele-

mentary statistics (designed for future *producers* of scientific information), there are few courses specifically tailored to critical thinking and decision making (designed for future *consumers* of scientific information). This is despite research showing that critical thinking classes addressing pseudoscience produce large and significant reductions in false beliefs, whereas classes in research methods do not (Dyer and Hall 2019). Studies show that there is no relationship between pseudoscientific beliefs and the understanding of scientific concepts (Goode 2002; Johnson and Pigliucci 2004) and only a weak negative correlation between pseudoscientific beliefs and science facts (Johnson and Pigliucci 2004). This suggests that sharply refined critical thinking skills are not guaranteed byproducts of science education. This explains how it is possible for universities to sometimes produce medical doctors that are homeopaths, biologists who deny evolution, and climatologists who deny the science of climate change (although this is much rarer).

Given that critical thinking relies on skills that can be acquired only through extensive study (perhaps under expert tutelage) and honed through practice, optimal outcomes may only be achieved with explicit and independent vertical integration of critical thinking and critical appraisal into education (Marin and Halpern 2011). Classes comprising basic science and media literacy skills, cognitive debiasing, and decision making must begin at school, progress through college and/or university, and continue throughout professional development so that the graduates and professionals of tomorrow will have these skills ingrained. In turn, they will be better equipped to distinguish science from pseudoscience—and information from mis- and disinformation—regardless of their field of study or chosen career.

Conclusions

We must not wait for social media platforms to proactively remove harmful mis- and disinformation or for federal policy to limit the reach of those individuals and organizations disseminating harmful content about public health. Debunking falsehoods is largely effective and represents an important tool in the ongoing fight against mis- and disinformation. However, we must acknowledge its limitations and, as an adjunct to widespread corrective messaging, we must place more emphasis on subtle defeasibility techniques and proactive prebunking strategies. Crucially, we need to rethink current educational priorities, and we must rally to convince governing bodies of the importance of critical thinking so that the relevant skills can be integrated into school, college, and university curricula. The future of public health, the effectiveness of science policy, and Asimov's notion of "intellectualism" may very well depend on it. ■

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How to Sell Pseudoscience

A great way to protect yourself against grifters and their snake oil is to learn the techniques they use to sell it. So let's have some fun and pretend to sell bunk!

MELANIE TRECEK-KING

We live in interesting times. Humanity's scientific knowledge has grown exponentially, allowing us to live longer, healthier lives than ever. Due to technological advances, we have access to nearly all that knowledge on devices we carry in our pockets.

Yet at the same time, health pseudoscience is flourishing. From homeopathy to reiki to urine therapy, potentially dangerous misinformation seemingly lurks around every corner (or after every scroll through social media). Unfortunately, many of us lack the skills needed to sort the good from the bad.

Pseudoscience fools us by cloaking itself in the trappings of science. It also appeals to the part of us that needs hope when modern medicine, despite its incredible progress, doesn't have all the answers. However, because pseudoscience doesn't adhere to the processes that make science reliable, being misled can lead to real harm.

The first step in protecting yourself against pseudoscience is recognizing its characteristics (Trecek-King 2021). But the best way to protect yourself against the hucksters—some of them con artists, others deluded true believers—and their snake oil is to learn the techniques they use to sell it. So, let's have a bit of fun and pretend to be grifters selling bunk.

Pseudoscience Peddling Techniques

Before we learn how to sell pseudoscience, we need to know what it is that we're selling. Yes, there's an incredible diversity of pseudoscientific products or services. But that doesn't matter because your *real* product is "hope" and a "sense of empowerment." (Both are illusions, but that's beside the point.)

Your goal is to convince potential customers that your product will solve their problems. Maybe they want to lose weight or reverse the signs of aging. Maybe they have a chronic condition that's difficult to treat or, worse, an incurable disease that might even be lethal. Your pseudoscience is the answer they've been looking for.

Now that we know *what* we're really selling, let's dive into *how* to sell it.

1. Get them to commit.

No one likes to see themselves as unintelligent or think they've made an irrational decision—and they definitely don't want to admit that they've been conned.

So once someone has purchased your product or service, they're likely to use confirmation bias to affirm their decision. And the more you can get them to commit, the less likely they are to change their mind. Start with a "risk free trial" or a "money back guarantee." Create a community, such as a social media group, where customers can bond over shared values or ideology. The more you can get your customers to adopt your product or service as part of their personal brand, the less willing they'll be to publicly admit they were wrong and the more loyal they will be to your pseudoscience.

2. Make claims that can't be proven wrong.

Scientific claims are generally falsifiable, in that we can test them and potentially prove them wrong. Conversely, many pseudoscience claims are unfalsifiable. But just because you

can't prove a claim wrong doesn't mean it's true! The good news for us as grifters is that many don't understand the concept of falsifiability. Instead of trying to prove claims wrong, they look for supporting evidence, and when they find it (because we can always find evidence if we're looking hard enough), they assume the claim is true.

The easiest ways to make unfalsifiable claims in pseudoscience are to:

a. Be vague: Vague claims are too undefined or unclear to be tested or measured. They basically don't say anything.

Vague claims are ubiquitous in health pseudoscience because manufacturers aren't legally allowed to make specific health claims unless the product has been approved by the Federal Drug Administration (FDA). So instead, they often make broad, sweeping statements that have the added bonus of convincing customers that their product is super-spectacularly awesome! Your product almost certainly isn't FDA approved, so you're going to want to avoid making specific claims that would require evidence. Instead, master the art of bullshitting: "Keeps your digestive system in balance," "strengthens the body's natural defense system," "optimizes cellular detoxification," "reduces fatigue and maximizes energy," and so on. What does that mean? Who knows? It doesn't matter.

b. Appeal to spiritual energies: The supernatural is (by definition) above and beyond what is natural and therefore isn't observable or testable.

Consider the pseudoscience of "energy medicine." While energy is observable and measurable and is used in evidence-based medicine (e.g., MRIs, X-rays, ultrasounds), the "energy" in "energy medicine" is none of those things. Instead, illnesses are caused by (unobservable) "energy fields" that flow through (varying and poorly defined) meridians or chakras. And of course, practitioners can "heal" you by "adjusting" these "energy imbalances."

Some additional buzzwords associated with unfalsifiable "energy medicine" to consider include: *vibrations/vibrational*, *Qi*, *life force*, *blockages*, *balances/imbalances*, *frequencies*, and *miasmas*; the list of possibilities is endless. Feel free to use your imagination! Because there's no way to use evidence to test unfalsifiable claims, any "evidence" that appears to support them is useless. But don't let that stop you! Make sure you say your pseudoscience is "evidence-based," even though it's not scientifically possible.

3. Don't worry about overpromising.

Scientists have to support their claims with evidence. They're open to all claims, but extraordinary claims require extraordinary evidence.

Luckily, as a pseudoscientist you don't have to proportion your claims to the evidence. You're only limited by your imagination! Exaggerated claims that promise simple solutions to complex problems are easy to sell. For example, if you were selling a supplement, you could claim it cures autism, cancer, and HIV! Or if you were peddling energy woo, you could promise it treats substance abuse and cures virtually every known illness and malady. Don't worry that these claims sound too good to be true. Remember, you're really selling hope. So go ahead and sell your "miracle cure" with "results guaranteed!"

4. Be confident and pretend to have all the answers.

Science, by its nature, is tentative and willing to change with evidence. But most people are uncomfortable with uncertainty and ambiguity; they prefer bold, definitive claims and statements. As pseudoscience promoters, this one's a no brainer. Lean in to the public's misunderstanding of science so they trust you more than the real scientists. Point out how wishy-washy scientists sound and that they're always changing their minds. Seriously, it's like they don't know anything! So whereas a doctor may say "possible treatments may have certain benefits" but that "there's a chance of some side effects," you can simply assert "my product has been proven to work with no side effects!"

5. Confuse them with meaningless technobabble.

Technobabble is using words that sound scientific but are either used incorrectly or they don't make sense in the context in which they appear—or they're just made up.

All scientific fields have technical jargon that helps experts communicate complex concepts with accuracy and nuance. The problem is you have to be an expert to understand it. By mimicking the language of science, technobabble provides a veneer of legitimacy.

Your options for technobabble are limitless. Think of it like a game of Mad Libs where the goal is a science word salad. For example: "Rids the body of chronic inflammation at the cellular level by detoxifying the enzymes and microbiotics that can cause bioenergetic imbalances and impair the body's ability to self-heal."

6. Don't use data; use stories.

If you want someone to buy your product, you could show them tables and graphs full of data obtained through carefully controlled experiments designed to minimize biases that demonstrate its safety and efficacy—or you could just use a testimonial.

There's a reason pseudoscience relies heavily on anecdotal evidence: it's easy and cheap—and effective. Stories are compelling, especially ones with strong emotions and vivid images. For example, after a rumor that rhino horn cured the cancer of an anonymous politician in Vietnam proliferated, demand skyrocketed and rhino populations plummeted (Watts 2011). Because rhino horn is basically just keratin, you could get the same "medicinal" effects from chewing your fingernails. Therefore, assuming that story is true, we can safely conclude the cancer went away for other reasons. Mistaking correlation for causation is one of the major reasons we fall for bunk. Most of us don't like to admit how easily we can be fooled. So don't let the unreliable nature of anecdotal evidence stop

Graphic created by author mimics many claims frequently made by pseudoscientific products.

you. Consider using before-and-after photos, a celebrity endorsement, or simply a quote from a customer (he or she can be anonymous, of course) about how it "worked for them."

7. Make sure to include key logical fallacies.

Logical fallacies are errors in reasoning that weaken an argument. Fortunately for us, they can be quite persuasive. While there are about a gazillion logical fallacies, there are a few that are the lifeblood of pseudoscience.

a. Appeal to nature: Argue that something is better, more effective, or safer because it's natural.

Not only is *natural* often difficult to define, but the origin of something tells us nothing about whether it's safe or effective. But because most people assume "natural" is better, appeals to nature are very effective. They are almost a must-have for any pseudoscience product.

Buzzwords to consider using include: *all natural*, *plant-based*, *chemical-free*, *organic*, *nature's wisdom*, etc. (Images of nature, such as landscapes or plants, also work.) And don't be worried about false advertising. With the exception of *organic*, there's no standard definition for any of these terms. They're essentially meaningless!

b. Appeal to tradition: Assert that something is good or true because it's been around for a long time. Historical reasons aren't evidence that something truly works; they're just inertia. Yet because it's commonly assumed that *old* means *effective*, appeals to tradition are a standard in pseudoscience. Buzzwords to consider using include: *ancient wisdom*, *ancients/ancestors*, *used for centuries/millennia*, etc.

c. Appeal to the masses: Claim something is true because a lot of people believe it.

Popularity doesn't determine truth; a lot of people can be wrong. But because we're social animals, appealing to the part of us that tells us what "everybody knows" can be quite convincing. When selling your pseudoscience, consider appealing to the many "thousands" or "millions" of customers who've benefited from your product or service.

d. Straw man: Misrepresent someone's argument to make it easier to dismiss.

Science is a process of testing ideas, of weeding out bad ones and building on good ones. It's not perfect, but it's the most reliable system of gaining knowledge that humans have developed. So if you want to convince customers to buy your pseudoscience, you need to convince them it's better than what science has to offer. And to do that, you're going to have to fudge what science is and what it does.

So be sure to tell your potential customers that, unlike conventional doctors who just want to give you drugs, you have a "holistic" and "patient-centered" approach that's "prevention-oriented" and "treats the root cause" of their illness. (Conventional medicine does these things too, using evidence-based approaches, but remember your goal is to pretend otherwise.)

e. *Ad hominem*: Attack the source of the argument instead of the substance.

Pseudoscience is likely to have its share of detractors, especially scientists who are trying to educate the public about the potential dangers of being misled by it. Your product is bunk, of course, so you can't respond on the merits. But you're going to want to get ahead of the criticism if you can.

One very effective technique is to call the scientists "shills" for industry or government and claim they're "greedy" and "in it for the money" and therefore can't be trusted. If you were

honest, you would admit that *you're* the one trying to take advantage of people by selling them false hope at a tidy profit. But you're not being honest. You want to sell them pseudoscience. So you have no choice but to convince them that it's the scientists who can't be trusted—not you.

8. Manufacture the illusion of expertise.

People generally trust experts, so you have a problem: you're not one, and the real experts don't agree with you. Thankfully, there's an easy solution. Just pretend!

Here are a few tried-and-true techniques to help you look legit:

a. Find or create a "doctor" or guru to be the spokesperson. The more likable and charismatic the better! You can always find someone with an advanced degree with wacky enough ideas to be your leader. It doesn't matter what their doctorate is in (choral conducting? English literature?); people don't tend to look up those kinds of details. Just remember to include "doctor recommended" on your product!

But if you can't find someone, don't worry; just make one up. Put someone in a lab coat, give them a legitimate-sounding title, and you're good to go.

b. Establish an organization or institution with an impressive-sounding name.

An easy way to provide an air of legitimacy to your product is to claim it's backed by, or part of, an organization or institution.

Let's pretend your pseudoscience product is a supplement made of regurgitated cat hairballs that will reverse baldness. You might say the product is backed by the United Hair Growth Association, the Institute for Reversing Hair Loss, or the Consortium for Feline-Human Hair Restoration. (And yes, I made all that up. But it sounds better than calling it the BS that it really is.) To really confuse potential customers, remember to box your product in an official-looking package and make sure it's sold in drug stores!

9. Shield yourself from criticism by claiming it's a conspiracy.

Scientists are used to criticism; it's part of the process and essential for progress. Ideas that withstand scrutiny are tentatively accepted until the evidence suggests otherwise.

So you're going to have to explain why your pseudoscience won't be able to pass this criticism and the experts all generally agree that your product is bunk. Your get-out-of-jail-free card is to claim that the "scientific establishment" (e.g., Big Pharma, the FDA, greedy scientists) is conspiring against you to "suppress the truth." And by claiming you're taking on the greedy establishment to protect the public, you get to come across as the trustworthy hero.

Feel free to play with your conspiracy; just remember your goal is to shield your pseudoscience from criticism. Tell potential customers that "your doctor doesn't want you to know" about your product, that "they are hiding the truth," and that they "won't hear about this in the mainstream media." (Insert any motive here: money, control, world domination, etc.)

The Take-Home Message

Peddlers of pseudoscience know what we want: hope when medicine doesn't have easy answers and a sense of empowerment when our situation feels out of control.

With this in mind, it's easier to see that despite the overwhelming diversity of health pseudosciences, the techniques used to sell them are very similar. This is excellent news for us as consumers, because once we learn their tricks they're easy to spot even in different contexts. This article, though in jest, has a serious lesson: Pseudoscience can be hazardous to your health. Real empowerment comes from being able to defend ourselves against potentially harmful misinformation.

One final note: The premise of this article is based in inoculation theory, which applies the logic of vaccines to misinformation. Essentially, by exposing people to a weakened form of misinformation (e.g., explaining how misinformation misleads), we can inoculate them against it (Cook 2017). This article uses what's called active inoculation; readers were encouraged to create the misinformation. In effect, instead of debunking pseudoscience, we were prebunking, or debunking in advance. Just make sure you use your "powers" for good and not for fooling people! ■

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Note

While some pseudoscience promoters are purposefully lying and trying to take advantage of people, others may actually believe in what they're selling. Nevertheless, the techniques used to sell bunk are the same regardless of intent, and the purpose of this article is to pretend to knowingly sell pseudoscience for the sake of learning those techniques.

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9/11 at 21: Perspectives in Light of the COVID-19 Pandemic

While the overall response to the 9/11 attacks was an overreaction, the critically delayed response to the far more deadly global pandemic has been an underreaction. Why?

CLARK R. CHAPMAN AND ALAN W. HARRIS

On the first anniversary of 9/11, we wrote the cover article of the September/October 2002 Skeptical Inquirer, "A Skeptical Look at September 11th." The editor later noted that our article elicited the most reader responses of any article published up to that time—and, we must say, most of the letters were critical of our claim that reactions to 9/11, in particular the creation of the Department of Homeland Security (DHS) and the Transportation Security Administration (TSA), were excessive and not very effective. On the tenth anniversary of 9/11, we wrote a shorter commentary, "9/11: Perspectives from a Decade Later." We concluded that piece by writing, "What is the legacy of 9/11? Sadly, it is a wasteland of fear and hate, expensive professional armies fighting endless wars, and a brand new bureaucracy of Homeland Security (including the TSA), which promotes its own continued existence and is unlikely to go away." Reader responses to that article were much more mellow and agreeable. Indeed, the DHS and other excesses of 9/11 have not been downsized.

In the past couple years, we have endured a massive worldwide pandemic of vastly greater consequence than the 9/11 event itself. In our previous articles, we did not compare with past pandemics or the prospect of one like we have been experiencing. The biggest relevant news when we arrived at the twentieth anniversary of 9/11 was the near end of the "forever wars" in the Middle East and South Asia by withdrawal of American military from Afghanistan. And since then, what may be a more serious war has begun with the Russian invasion of Ukraine. If threats of using nuclear weapons are implemented, this new war could become the biggest news of the twenty-first century. Thus, it is appropriate to update and expand our perspective twenty-one years after 9/11. Our update has been delayed a year by the more recent relevant events of the pandemic and the Ukraine war. But the story is not finished.

Let us address the lingering costs of 9/11, now that the

twenty-year war in Afghanistan is history. The Watson Institute of Brown University has tabulated costs in terms of human lives in the various countries and monetary costs separated out in various categories. Overall, they estimate our warfare in the Middle East in the past twenty years has cost eight trillion dollars and about 900,000 civilian and military lives (https://www.brown.edu/news/2021-09-01/costsofwar, https://watson.brown.edu/costsofwar/figures). Even if parsed only to Afghanistan, U.S. military and civilian contractor lives lost from fighting the Afghan war (6,241) exceeds the death toll on 9/11 twice over, and if one includes all deaths of all nationalities resulting from the Afghanistan hostilities of the past two decades, it comes to 176,000, vastly greater than the number of deaths that triggered the hostilities. In light of numbers such as these, we should pause and reflect on the cost of revenge through warfare.

In our earlier articles, we compared the initial death toll of 9/11 (just shy of 3,000) to the monthly rate of fatalities from motor vehicle accidents in the United States (somewhat greater than 3,000 and continuing month after month) and to various other causes of accidental death, such as natural disasters (earthquakes, floods, etc.) and even "malicious attacks" such as homicides (about 15,000 per year). What we did not compare was the death rate from pandemics. The current one has led to more than one million deaths in the United States and is continuing. In this article, we emphasize issues from an American perspective, in part because the United States has endured the second largest per capita death toll from COVID-19 of any major country.

In some months (from mid-December 2020 to mid-February 2021), the pandemic has led to more U.S. deaths per day than 9/11, day after day for months! Even if we prorate those deaths over the century since the most recent past pandemic (1918–1920), it comes to more than 6,000 deaths per year, which is more than 9/11. The World Health Organization (WHO) considers the U.S. COVID-19 death toll to be an underestimate, as are official numbers from other countries, and WHO now estimates the world death toll at over fifteen million. The previous influenza pandemic a century ago had a U.S. death toll of two-thirds of a million, when the population was only about 100 million, so per capita it was about twice as deadly as the current pandemic, at least so far. The worldwide death toll was many tens of millions. Thus, it seems that pandemics, even though they may occur only about once a century, have an annualized death toll even greater than the direct fatalities on 9/11, which hasn't recurred at all in two decades. To be sure, abrupt events capture more attention and response per mortality than extended events, such as pandemics, and aggressive "attacks" such as 9/11 even more so.

Much has been made of mismanagement of the current pandemic. For example, limited public funds were spent on health care and preparations for a possible pandemic while "homeland security" following 9/11 continued its massive funding. In an opinion piece in the *Los Angeles Times*, Elizabeth Rosenthal (https://www.latimes.com/opinion/story/2021-03-28/public-health-pandemic-human-terrorism) noted that federal support for state and local public health preparedness fell from $940 million in 2002 to $675 million in 2019. She further noted that former Centers for Disease Control (CDC) Director Thomas Frieden offered this funding disparity as one reason that the federal government had too few ventilators when COVID-19 hit but had an enormous stockpile of anthrax vaccine.

In our 2011 article, we noted that "game changing" events occur about once in a generation, and we cited the economic crash of 1929 and the depression that followed, Pearl Harbor/World War II (including the Holocaust), the launch of Sputnik, and "now" 9/11, noting, "Each of these events has spawned dramatic changes in how we live—some good, some bad, some equivocal." To this, we can now add the current pandemic. We may look back on the Ukraine War as still another, though it began only two years after the pandemic; its game-changing potential awaits future developments. We concluded in 2011 that the response to 9/11, while prompt and substantial, was a severe overreaction disproportionate to the damage of the attack or the realistic chances of future equivalent attacks.

The response to the current pandemic, within the United States and many other countries, has been rather the opposite, basically a delayed under-response. It started out with denial and delayed action and continued into a quagmire of misinformation, disinformation, political infighting, and multitudes of individual authorities spouting thousands of differing requirements and protocols. The basics of how to implement a coordinated, science-based response were not unknown. For example, a major table-top exercise (titled Crimson Contagion, involving over one hundred federal, state, and other agencies) had just been completed a couple months before the beginning of the COVID-19 pandemic (see https://en.wikipedia.org/wiki/Crimson_Contagion). Despite being produced by the Trump administration, the warnings in this report about how to prepare for a pandemic were not implemented. Instead, the report (and literature cited therein) was filed away, forgotten, and never consulted early in the pandemic.

This airborne viral pandemic became worldwide news in January 2020. At the start of such an infectious pandemic, it is vital to stop its spread immediately, before exponential transmission becomes widespread. How to stop it is straightforward, if not practically easy to implement: try to keep potentially infected people far from each other (much more than the six-foot distance suggested), require high-quality masks to minimize inhaling or exhaling virus particles, avoid stagnant air (e.g., inside buildings), and avoid contact with potentially contaminated surfaces. Any droplets containing virus must become widely dispersed and diluted (or the virus must die) before reaching other people. China actually adopted many such policies in Wuhan, but only after an unfortunate month-long delay. There were fits-and-starts in the United States in February 2020, but with the president denying a serious threat, the virus soon multiplied and spread to many parts of the country. Severe lockdowns, lasting only weeks or a month or two, perhaps could have stopped the pandemic from spreading but were minimally implemented. Once the virus

was widespread in parts of the world, few nations could have protected themselves (other than special cases such as New Zealand). The WHO also delayed, not declaring a pandemic until March 11, 2020.

Lockdowns are now widely disliked. In 2022, it is too late for even an extraordinarily strict lockdown to stop the pandemic because the virus is everywhere, has become extremely infectious, and partly evades earlier immunities. And unlike a month-long lockdown, partial measures extending for many months or years are psychologically intolerable to sustain, especially when such half-measures aren't working. Current vaccination programs and treatments can lessen the severity of infections (at least in principle), but they could not have played a role in stopping the pandemic initially. A vaccine for a new virus must be developed, tested, manufactured, and distributed to arms, which takes time—a year in the case of COVID-19, but certainly no less than a few months.

We would hope that scientific measures might be applied at the start of the next pandemic, which will happen sooner or later. But can it be done given the realities of human psychology, sociology, and politics? Can we just blame presidents such as Donald Trump and Brazil's Jair Bolsonaro (and their advisors) and hope for better leaders next time? Or is it hopeless to organize public health measures nationwide in a country of separate states with ever more people prioritizing their individual freedoms over societal responsibilities—and with many "originalist" judges considering public health measures unconstitutional? And is it also hopeless to expect worldwide coordination of public health with all the disparate national cultures and leadership structures? We just don't know.

It's possible that strictly policed initial measures would evolve into a health bureaucracy, which might outlast its usefulness, as has happened with elements of DHS long after 9/11. Or perhaps such strict measures would be immediately defied in some cultures and never succeed in stopping a pandemic. It's too soon to answer these questions. In the long run, those of us who survive the current pandemic (unlike the million Americans who didn't) may enjoy going out for a burger and a beer with friends without as much hassle as getting through the TSA to board a plane.

So why have there been opposite reactions to 9/11 (overreaction) and to the pandemic (underreaction)? Possibly it is because of the perceived duration of the emergency; 9/11 happened in a couple of hours and was over by the afternoon. Of course, deaths continued afterward (e.g., contamination of workers cleaning up the World Trade Center, subsequent wars), but it is the approximately 3,000 killed immediately whose names continue to be read out on annual anniversaries. In contrast, public awareness of the pandemic developed over several months, and perceptions continue evolving today as COVID-19 rages on in the United States, Shanghai, South Africa, and around the world. We can't possibly read the names aloud of the many millions who have died, so they are merely anonymous statistics.

Another distinction is the nature of the emergency. The 9/11 event happened in dramatically visible ways: airplanes crashing into buildings and people jumping from tall buildings all caused by evil people. The pandemic unfolded obscurely, caused by an invisible virus, with some social media and political influencers saying that it wasn't happening at all, being worst (initially) in distant countries, such as China and Italy, and involving highly technical scientific and medical methods to combat it. Of course, medical workers in hospitals saw bodies piling up in refrigerated vehicles and family members of the dying (in New York City, Michigan, and elsewhere) knew what tragedy was happening. But most TV viewers didn't find COVID-19 central to their lives, except for the discomforts of public health restrictions, which were illogically and unevenly applied (e.g., for political rather than scientific reasons) as months advanced. So the sense was that the measures weren't working but were interminably restricting their lives. Instead of the enemy being perceived as the virus (as with the 9/11 attackers), the enemy began—for many people—to be perceived as the public health agencies and politicians who were impeding our lives inconsistently, largely acting from politics rather than science.

There is a distressing divisiveness that has grown in our society over the past twenty years, partly due to the 9/11-inspired "culture of fear." Let us emphasize in conclusion that changes in our lives are not all driven by singular events; some "just happen" and are not associated with the abrupt life-changing events we have discussed. Indeed, much change is slowly evolving and largely unnoticed until after the fact. Looking back over the twenty to twenty-five years before 9/11, we were already subject to TSA-style security with magnetometers and luggage X-rays; it just was enhanced after 9/11. And some of the even bigger life-changing innovations were completely unpredicted back then. Though the internet was born a couple decades before the attacks, it and cell phones became a primary means of communication soon after 9/11. These innovations at first may not have seemed transformative, but with the rise of social media they have transformed our lives far more than things such as TSA security or pandemic restrictions. They were not associated with any single life-altering event—or for that matter even noticed much by the public until they became part of our daily lives ten to twenty years ago. With that in mind, we must be cautious in attributing specific changes to abrupt events such as 9/11 or longer-lasting disasters such as COVID-19—or in trying to predict what the future will bring. ■

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Are Skeptics Wrong about the Value of Anecdotes?

Anecdotes can have an important role in science if the correct population for conclusions is identified and special care is taken about bias. They can even be utilized in formal testing of some skeptical hypotheses about anomalous phenomena.

CHARLES G.M. PAXTON

It is therefore not just to consider anecdotes merely as a source of entertainment, because they amuse; if it shall be found that they serve also for the purposes of utility, they will deserve to be classed higher in the scale of study than hitherto they have been.

—Isaac D'Israeli, *A Dissertation on Anecdotes*, 1793

It is generally assumed among many scientific skeptics that anecdotes are not part of science (e.g., Shermer 2003; Hall 2013). The maxim "the plural of anecdote is not data" is well established in skeptical literature, as are variants such as "the plural of anecdote is not evidence" (e.g., Polidoro 2017) and "the plural of anecdote is misinformation" (e.g., Stea 2020). Online skeptical articles that utterly dismiss anecdotal data proliferate (e.g., Fallacy Man 2016; Krej 2013; Novella 2007). I would argue that such dismissal is unjustified and that anecdotal information is rather more used and useful in science than many skeptics imagine.

Causal Stories

Ignoring the point that the original maxim from political scientist Raymond Wolfinger was that "the plural of anecdote is data" (see Nguyen 2015 for a history), the phrase has now become a warning to those who collect anecdotes (here defined per the *Oxford English Dictionary* as "a short account of an amusing, interesting, or telling incident or experience") and potentially think of them as data—or at least as evidence for a particular conclusion. One problem with personal anecdotes, as many skeptics have rightfully discussed, is incorrectly inferring a causal story. "Dancing naked under a full moon cured my COVID-19" may be a compelling personal narrative for a single layperson, but it does not pass muster for a scientist. Assuming the account is subjectively true (the patient did have COVID-19, did dance naked, and did get better), the risk of a causal correlation fallacy is high because essentially it is a statistical claim with a sample size

of one. There is often neither an obvious causal mechanism that would allow a deterministic qualitative argument nor is there a significant statistical argument. Dancing naked may have cured the COVID-19, but the patient might have gotten better anyway; there is no baseline for comparison. The only way to even begin to infer causation would be an experiment or (weaker) an observational study with samples of people dancing or not dancing. If such samples existed, then they could be used to infer an effect. As this set of circumstances seldom exists for complex claims of disease remission, they are rightly dismissed by scientists. The claim of causality is even weaker if the anecdote is at some distance from the original source (e.g., pop singer Nicki Minaj's September 13, 2021, tweet that a COVID-19 vaccination caused her cousin's friend to develop impotence).

However, such tales might still be useful as a source of hypotheses even if they can be manipulated by charlatans and snake-oil salesmen. Anecdotes can be part of the hypothesis formation part of the classic scientific method, when the investigator has some casual observation they want to investigate formally that might indicate a particular cause. Some journals in medicine even allow case reports to be reported (e.g., *Neurocase, Epilepsy & Behavior Case Reports*, *BMJ Case Reports*). This is especially valuable if the syndrome is extremely rare.

However, causal stories are but one type of anecdote. Patients could report symptoms without an initially obvious putative cause, or people might simply recount incidents from their lives that involve some unusual or interesting claim. No generalization or causal argument need be implied. And it's not only medics. Zoologists, for example, may report one-off interesting cases of animal behavior (e.g., Moeliker 2001; Fulling et al. 2017) or sightings of out-of-place animals (e.g., Scheinin et al. 2011). Obviously, an anecdote supported by a photograph or other additional information makes a stronger case than a recollection alone—especially at a distance in time.

Anecdotes as Data

Could these accounts of singular events collectively be considered data? The *Oxford English Dictionary* defines *data* as "related items of (chiefly numerical) information considered collectively." Confusingly, the term can be singular, meaning a dataset or even archaically meaning what we now call a "datum," a single item of information.[1] It stands to reason that any anecdote could be considered a "datum" (they are information, after all) and a collection of anecdotes "data," but that is not the real test of the utility of anecdotes as data in a scientific context. The dictionary also says that data is "typically obtained by scientific work and used for reference, analysis, or calculation." So the real question is whether anecdotes can be used for reference, analysis, or calculation. This means we need to consider the value of anecdotes as quantitative data.[2]

There are three reasons these sorts of anecdote might not be considered data when collected together for analysis, calculation, and reaching conclusions:

1) The anecdotes simply may be untrue.

2) They may be imprecise, in the technical statistical sense that an anecdote may be a relatively noisy recollection of an actual event, perhaps to misperception or memory or exaggeration.

3) Anecdotes could be inaccurate in the statistical sense of biased relative to the truth, which may not actually be known. This could be because of confirmation bias, misperception, lack of controls, or selective memory but also in another important way discussed in the biased anecdotes section below.

Of course, the first reason is also a feature of normal data, so that cannot be grounds for dismissing anecdotes in entirety even if anecdotes are at far greater risk of being untrue. No, it is really the additional reasons that are grounds for rejecting anecdotes. In the case of the second reason, however, if there were many anecdotes of the same event, then the average account might be representative of the data under consideration, because *imprecision* to a statistician means the noise on average is unbiased. So, for example, if there are ten witnesses to a murder, all ten could give an estimate of the height of the murderer. They might all be wrong in their individual estimates, but their mean estimate would be closer to the truth. The more witnesses, the closer the average of the estimates would probably be to the truth *assuming the witnesses are unbiased in their estimates*. This property is extremely useful because it means collected anecdotes can be used as data if they are merely imprecise.

For example, when a drug has passed through clinical trials and gone to market, possibly thousands of patients will take the drug over longer time periods than could be tested in a clinical trial. Low-frequency side effects of drugs can be reported systematically by the patients (this is known as a Phase IV clinical trial) and compared to reports of problems in a control group. Now some of those reported side effects will have nothing to do with the novel drug or treatment, but some of them might. The reported anecdotes about those side effects will occur at a greater frequency in the treatment group compared to the control group. There are also vaccine reporting systems. The individual anecdotes of side effects are imprecise, but collectively they might represent a useful sample. Such unbiased imprecision may well be rare, but if present, anecdotes can be usable data. Here I give two further examples from epizoology and astronomy.

Dogslife is a web-based longitudinal study of Labrador retriever health in the United Kingdom (Clements et al. 2013; Pugh et al. 2015). Dog owners supply their reports of their dogs' health to a central database, which is then used to undertake a longitudinal (in time) study of their health. Owners were recruited and asked to supply quantitative information on the weight and other characteristics of their pets but also any illnesses that did not necessarily result in a visit to the vet. This meant the reports of illnesses were not verified. They were anecdotes, but the results of such a survey can be useful in understanding the spread of diseases, such as an acute vomiting syndrome that appeared in dogs in late 2019 and early 2020 (Woolley et al. 2021). A single story of illness in the life of a Labrador would have little evidential value, but together

such accounts have considerable usefulness.

Similarly, Tatum and Stumpf (2000) used eyewitness estimates of the position of fireballs in the sky to estimate the tracks of meteors over Vancouver Island in 1998. A single account of a meteor might be imprecise, but with multiple witnesses the meteor's progress can be estimated with high precision.

Biased Anecdotes

This leaves the question of biased anecdotes. Anecdotes may simply be inaccurate (as might normal data). Indeed, the first situation above might be looked on as the most extreme form of the third situation. Thus, it is only inaccuracy that *could* render anecdotes as not amenable to science. I say *could* rather than *must* because the bias is a function both of the data *and* the population the conclusions are being drawn about. If you are feeling ill, you might well go to your doctor and report a pain in your abdomen, "a telling experience" for you, as per the definition of anecdote above. If the doctor responds, "This reported experience has no interest to me; it is a mere anecdote," you would rightly feel affronted that relevant evidence was not being considered. Your anecdote is actually representative of your (admittedly subjective) well-being. This addresses the central issue in the consideration of anecdotes: they can be biased but that bias depends on what population is under consideration. By population, I do not mean population in the sense of "the population of the United Kingdom" but in the sense of the *statistical population*—the larger group that conclusions are being made about. Your anecdote about pain is representative of the you at the moment of visiting the doctor. It is not representative for the well-being of neighbors, siblings, the collective inhabitants of your town, or even you at another point in time. But it is still useful to the doctor. It is an unbiased sample of the statistical population of reports of your pain at a particular point in time. Of course, it may be referred pain, meaning the source of the trouble is not where you report the pain, but nevertheless it is information potentially usable by the doctor. Medical diagnosis thus revolves around the use of anecdotes in addition to formal observations such as chemical tests and X-rays. Doctors may not like to think of reported internal symptoms as anecdotes, but surely they are if specific and initially not corroborated.

Likewise, witness statements of a crime, for example, are not dismissed by the judge as irrelevant anecdotes to the proceedings of a court case. The observations are admitted as evidence but with always the concern that the witness might be inaccurate in the formal sense or lying.

The above are singular cases, but what happens if the question is "What proportion of the population reported abdominal pain in a given year in town X?" The population of interest is the whole town. Now if a sample is collected of reports of abdominal pain from patients in the local hospital, then this might well be biased; there could be disproportionately more people with abdominal pain in the hospital than in the wider community (or vice versa if mild stomach complaints are considered). Then these anecdotes would be inappropriate for drawing conclusions about the population of the town—but would be appropriate for drawing a conclusion about the proportion of people in the town's hospital who feel a particular pain.

So anecdotes that are biased cannot be used as data (unless somehow the bias can be corrected for), but whether they are biased can depend on the statistical population under consideration.

Anecdotes about Anomalies

At this point, hopefully the value of anecdotes is clear. But you might still be reluctant to accept the reports of anomalies as data. People report giant ape-like entities often called Bigfoot across North America. The witnesses typically report them as taller than humans. If I were to make conclusions about Bigfoot height from a random sample of anecdotal reports, say from the Bigfoot Field Researchers Organization (BFRO), my conclusions about Bigfoot height (if they actually existed and most especially if they do not exist) may well be biased. However, if I were making conclusions about how tall Bigfoot are *reported to be*, then I can proceed with my analysis (assuming the BFRO database is an unbiased sample of Bigfoot reports; it might not be). Thus, the anecdotes that would be an entirely inappropriate sample for making conclusions about Bigfoot are an entirely appropriate sample for making conclusions about the population of *reports* about the creature. This is useful because while Bigfoot may or may not exist, reports about them undoubtedly do, and this allows us to investigate the sociological and cultural aspects of anomaly reports in a rigorous manner and escape what Harriet Hall (2012) has referred to as "tooth fairy science," performing science on things that may not exist.

For example, a colleague and I (Paxton and Naish 2019) investigated whether there had been changes in how sea serpents were described over the past two centuries by undertaking a statistical analysis of the collected anecdotes. This was a test of a statement asserted, in fact without any evidence, by science fiction writer and skeptic L. Sprague de Camp (1968; 1983) that "After Mesozoic reptiles became well-known, reports of sea serpents, which until then had tended towards the serpentine, began to describe the monster as more and more resembling a Mesozoic marine reptile like a plesiosaur or a mosasaur." We found that de Camp was partially right. There was evidence that sea serpent reports became more like the plesiosaurs (but not mosasaurs) of the Mesozoic Era over time with the presence of necks being more emphasized by reporters (see Figure 1). Of course, we cannot be sure about causation; perhaps something other than increased paleontological knowledge caused sea serpent reports to become more "necky," but the point is, we were not making claims about sea serpents; we were making claims about sea serpent *reports*. Likewise, Paxton and Shine (2016) established the consistency (between and within witnesses) in quantitative measures (length, distance, etc.) from accounts of aquatic

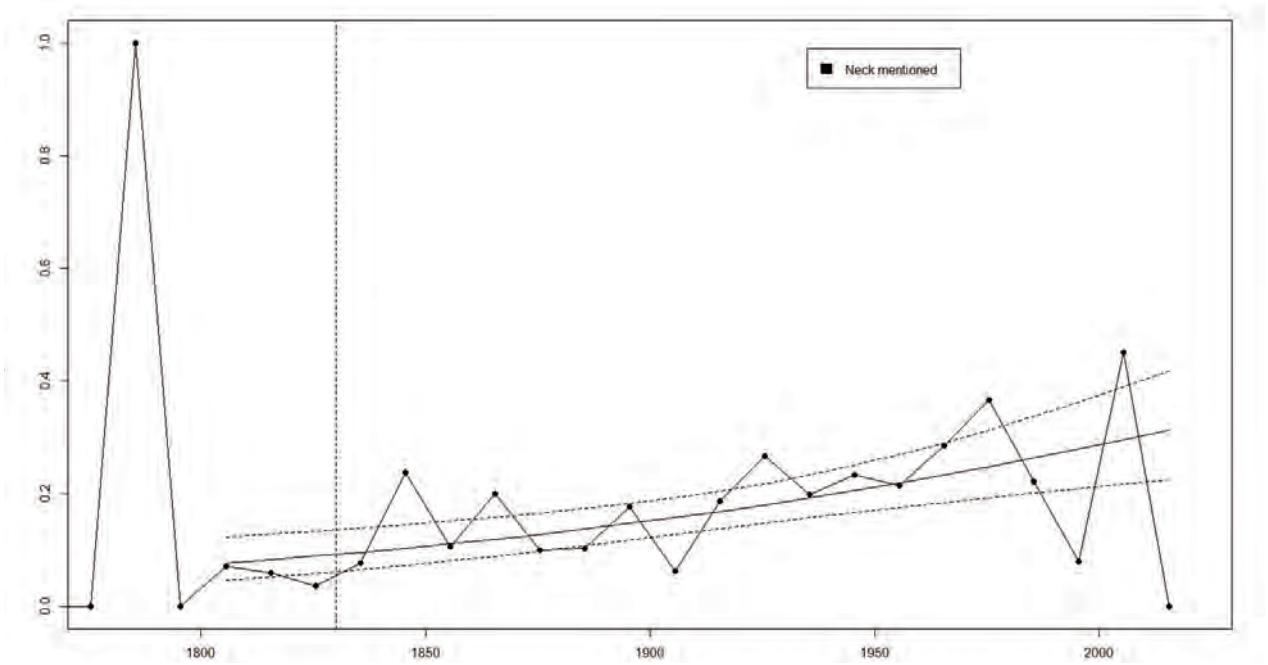

Figure 1: Anecdotes as data. The proportion of sea serpent reports (binned into five years) that mention a neck through time (from Paxton and Naish 2019). Solid lines with dots: actual data. Solid line without dots: fit from a model. Dashed lines: 99 percent confidence intervals on model fits.

monsters. We were not saying sea monsters were consistent but that reports of sea monsters by witnesses in the same encounter were consistent. In these cases, no baseline is required; we can infer things by simply looking at the patterns in the collected anecdotes.

So as long as reports of anomalies are recognized as part of a chain from eyewitness experience to collected analyzed reports, appropriate conclusions may be extractable from the anecdotes. And because many anomaly reports may be creations of human psychology and sociology rather than some actual perturbation of nature, it seems entirely appropriate to consider them in this way and identify changes in the signal in the chain from observation to collated report.

However, there is another point about anecdotes of anomalies. If phenomena are real but very rare, they will only be reported as anecdotes. As we have seen, these may be rare behaviors that could provide insight into animal or human cognition (see Byrne 1997 or Bates and Byrne 2007 for discussions) or phenomena from the natural world. Many low-frequency, albeit important, natural phenomena, such as meteors (Burke 1986), sprites (luminous disturbances above thunderclouds, Boeck et al. 1998), and rogue waves (Draper 1964) were initially reported only as anecdotes. Now, of course, we have corroborative evidence for these phenomena, but originally we did not. One of the few possible approaches to understanding such phenomena would be statistical analysis of the collected anecdotes for identifiable patterns in occurrence. I am currently considering hypotheses of aquatic monster, ghost, and UFO generation in this light. Such an approach allows skeptical hypotheses not to be merely asserted, as alas they so often are, but *tested*. Skeptics can complete the scientific process by testing their hypotheses. The plural of anecdote can be testable data.

Anecdotes can be used to consider other things too. Eyewitness accounts have been used to date the probable extinction of the dodo (Roberts and Solow 2003; Hume et al. 2004), the Danubian population of the Atlantic sturgeon (Jarić et al. 2009), and the Atlantic population of the gray whale (Mead and Mitchell 1984), as well as the possible persistence of the Caribbean monk seal (Boyd and Stanfield 1998). However, these methods assume the testimony is correct, which may not be the case.

Conclusions

So, contrary to the common opinion of many skeptics, anecdotes are far from being solely the material of pseudoscience peddlers and charlatans. Anecdotes are actually vital to the scientific process in generating hypotheses, confirming hypotheses—and, yes, even as data.

But the point about anecdotes is wider. Anecdotal and other forms of what might be called nonconventional information can be used by scientists to investigate and solve real-world problems. Statisticians and scientists can use and even analyze all sorts of information that does not fit the classical definition of data: this can include anecdotes but also indigenous knowledge (e.g., Giles et al. 2016; Ban et al. 2017) and expert opinion (Cooke 1991; O'Hagan et al. 2006), which is useful if a system cannot be readily investigated—for example in estimating if underground pipes need to be replaced. Such "data" may be far from ideal (systematically collected information is always to be preferred) but unconventional information may be a viable choice if no other information is available. Skeptic Robert Carroll (2014) changed his view of the value of anecdotes when he was diagnosed with pancreatic cancer and had to make decisions about treatments not neces-

sarily as yet supported by the complete outcomes of randomized controlled trials. The only information then available was more or less anecdotal supported by expert opinion.

The "plural of anecdote" maxim has been accepted by many in the skeptical movement because it fits their prejudices rather than reflecting actual scientific practice. Yes, we know there are massive flaws in human perception, memory, and reasoning that lead to spurious causal correlation errors and claims of paranormal experiences. Misuse of anecdotes to make dubious causal claims—especially in what is called "alternative medicine"—is a huge problem, but this does not make anecdotes useless. The distinction between anecdote and data is not a dichotomy but a blurry spectrum. The distinction depends on how the anecdotes were collected, the analyses, the population under consideration, and the conclusions being drawn. Just because scientific skeptics lack the ingenuity to think of novel ways in which strange forms of information can be used in an unbiased manner, that does not mean that statisticians and others don't! The question of what constitutes "good" evidence can be a nontrivial problem. The time has come to drop the overly simplistic "the plural of anecdote is not data" slogan. ■

Acknowledgments

My thanks to Valentin Popov and four anonymous reviewers for comments on the manuscript.

Notes

1. Two reasons it is unwise to insist the right form is always "data are"!
2. I consider the use of anecdotes in the qualitative social science a different issue.

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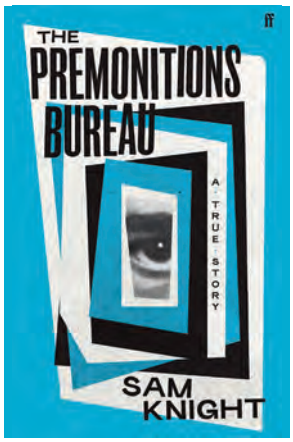
Predictions—or Coincidences?

KARL SABBAGH



The Premonitions Bureau: A True Story. By Sam Knight. New York, NY: Penguin Press, 2022. ISBN 9781984879592. 256 pp. Hardcover, $28.

"Premonitions are impossible but they happen all the time," says the jacket text on this book, quoting the author. This is true up to a point. *The Premonitions Bureau: A True Story* is a difficult book to pin down. Fortunately, it is not a wide-eyed promotion of the idea that some people can predict the future (although based on some of the loose terminology and weasel words the writer uses, the reader could be forgiven for thinking it is). But as a *New Yorker* writer (the book started as an article in that magazine), Sam Knight is subtler than that and managed to keep this skeptical reader onside—most of the time—though it is a difficult line to tread. How are we to interpret Knight's description of one of the key subjects in the book as a *seer* other than as an expression of belief in his abilities?

But fortunately, despite its sensationalist angle, this book is about much more than the Premonitions Bureau of its title. This was a British tabloid newspaper stunt in the 1960s, initiated by psychiatrist John Barker, who was moved by a mining catastrophe in the Welsh village of Aberfan that killed 146 people (most of them children). Barker wondered whether such tragedies could be prevented by monitoring premonitions of future disasters. He put the idea to Peter Fairley, science reporter of the London *Evening Standard*, who jumped at the idea.

Of course, collecting premonitions in advance is not without its problems. Humanity is regularly faced with disasters, including fires, volcanoes, plane crashes, and pandemics, and even random predictions can sometimes make a hit. On a more trivial level, I can safely make a prediction to you, my reader, that in the next few weeks a significant event will occur in your life involving the color red, or perhaps green, and the number three—though it might be eight; it's a little unclear in my mind. For the reader who suffers a collision with a red car on the third of next month, this may seem conclusive proof of my psychic abilities. For the rest of you, it won't.

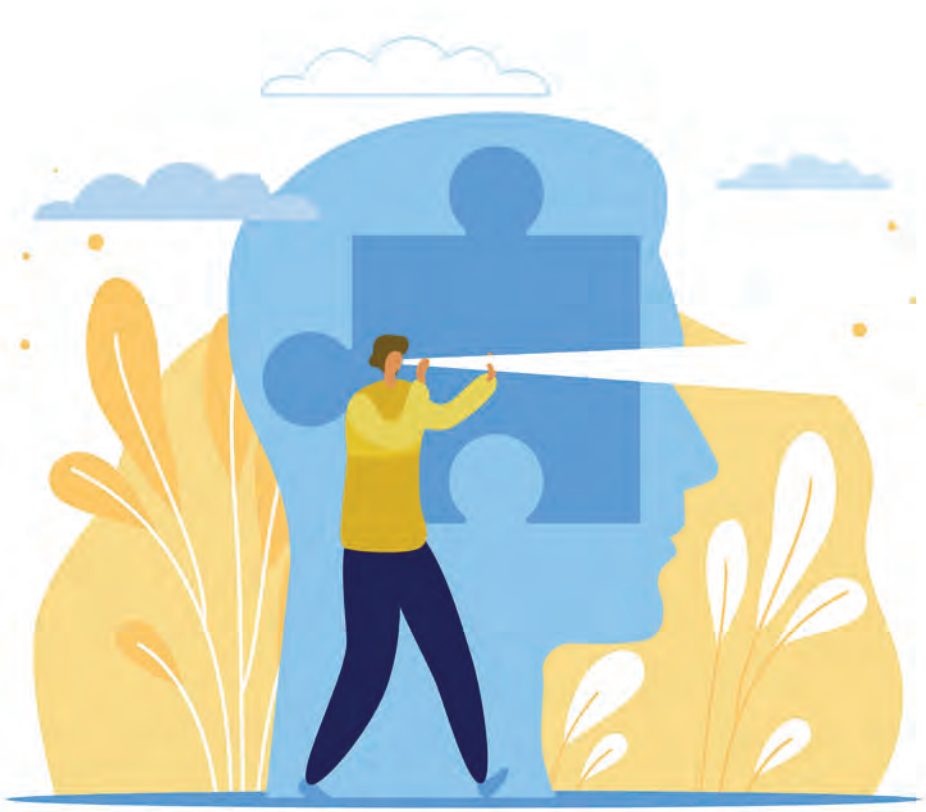
In fact, this book is really the story of four individuals: the psychiatrist, the journalist (whom I knew quite well in the 1960s), and two of the people who submitted premonitions to the Bureau deemed to be most successful, Lorna Middleton and Alan Hencher.

The people were all, in some way, a weird bunch, if truth be told—complex, troubled, obsessed mavericks. Barker was fascinated by death and the way people could will their own deaths. Perhaps it was because he never concealed this fact that his two most prolific "premonitors" expressed concerns about Barker's own death on several occasions before he died (of an aneurism). Fairley himself was unusual in having a second family unknown to his wife and children (and to me when I knew him) and in wanting to believe in the paranormal. And the picture painted in the book of the two "seers" shows them as decidedly eccentric as well.

In the space of a year, the Bureau received 723 predictions of which eighteen "came true" in Fairley's estimation. To take one example, on March 21 Hencher foresaw a plane crash of a Caravelle jet soon after takeoff. It took a while, but four weeks later a Bristol Britannia (not a Caravelle), a turboprop (not a jet), crashed before landing (not on takeoff), killing 126 (not 124). (As a matter of interest—not mentioned by Sam Knight—in the three months after Hencher's premonition, there were seven other commercial airliner crashes, killing a total of 259 people. One of the others was even a Caravelle.)

Reading this sort of stuff can make you hyperaware of the nature of coincidence. A few random examples: Hencher's prediction of 124 dead in the plane crash comes *on p. 124* of the book. I read the mention by Knight of Jeremy Taylor, a seventeenth-century Anglican vicar, an hour or so after I had been talking to my wife about—yes, Jeremy Taylor, the seventeenth-century Anglican vicar. On p. 200, there is an event that occurred *on my birthday*. On p. 67, there is an account of the death of Donald Campbell during a world water speed attempt that took place in 1967.

In the end, what this book shows is the human propensity to look for mean-



ing and patterns in essentially random events. I have seen an analysis of the experience many of us have had, when someone thinks of a person—perhaps a friend or relative—and within an hour a letter or phone call is received from that very person. The statistics of such events—based on the number of people the average person knows, the likely number of times we think about them *without* hearing from them within an hour, the number of calls, letters, and emails we receive every day—suggest that if we lived in a world where such things *never* happened, there would be a real cause for concern and investigation. That would be a claim of the paranormal if ever there was one. ■

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NEW AND NOTABLE BOOKS]

Listing does not preclude future review.

HOPE AND FEAR: Modern Myths, Conspiracy Theories, and Pseudo-History. Ronald H. Fritze. "People will believe the strangest things," Fritze, a professor of history and religion, begins this book. It is an understatement. He explores the fringe ideas and conspiracy theories people have turned to over the decades, from myths about the Knights Templar and the Ten Lost Tribes of Israel to Nazis and the occult, *The Protocols of the Elders of Zion*, and UFOs. He demonstrates that when myths and pseudohistory dominate a society's thinking, reality and truth fall by the wayside. The disruptions of globalization have led to people embracing conspiracy theories and, in his words, "freakish fantasies." What will be the outcome? We don't yet know. University of Chicago Press, 2022, 271 pp., $27.50.

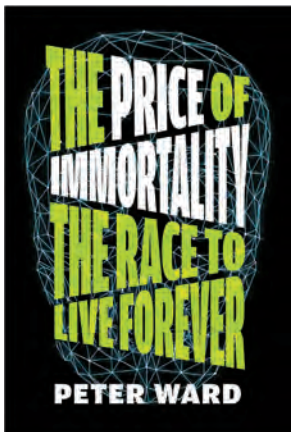
MY ADVENTUROUS LIFE. Dick Smith. Dick Smith is a national hero in Australia—an entrepreneur (Dick Smith Electronics), publisher (*Australian Geographic*), globe-trotting aviator, environmentalist, philanthropist, and skeptic. A fellow of the Committee for Skeptical Inquiry, he sponsored James Randi's investigations of dowsers in Australia, which led directly to the creation of the Australian Skeptics. This book recounts that episode, but it is mainly about his other adventures. A few of the chapter titles gives the scope: "Planning My First Expedition," "Taking to the Skies," "Solo around the World in a Helicopter," "Solo to the Top of the World," "Off the Edge of the World," and "Marching to a Different Drummer." The book has won the Australian Book Industry Awards' 2022 "Biography of the Year." Allen & Unwin, 2021, 342 pp. $39.27.

THE PREMONITION: A Pandemic Story. Michael Lewis. In October 2019, a global group ranked the United States #1 among all 195 countries on readiness to combat a pandemic. What went wrong? Best-selling author Michael Lewis examines the story of how the great talents of a society are wasted if not properly led. He explores the gaps between our society's then-reputation and its performance against COVID-19. He tells the story mainly through its heroes—scientists, epidemiologists, physicians, and other world-class medical experts who did their best to warn the country of the dangers of a pandemic—and the wall of ignorance that was the official response of the Trump administration to the COVID-19 outbreak. Norton, 2021, 304 pp., $30.00.

—Kendrick Frazier

Questioning the Quest for Immortality

GABRIEL ANDRADE



The Price of Immortality: The Race to Live Forever. By Peter Ward. Brooklyn, NY: Melville House, 2022. ISBN 9781612199528. 288 pp. Hardcover, $28.99.

In Greek mythology, Orpheus goes to the underworld to recover his deceased wife, Eurydice; Hades—the god of the underworld—grants his wish, under the condition that he not look back at her. Orpheus does not comply and loses Eurydice forever.

Peter Ward uses this story as the starting point of *The Price of Immortality*, because it is a cautionary tale to "emphasize the dangers of rejecting death." Indeed, this story is about *hubris*—the human pride so vehemently scorned in Greek myths. But I wonder: If Ward is so concerned about hubris, why did he choose this story in particular? Why didn't he tell the story of Icarus, who as a result of his pride flew too close to the sun, fell, and died?

Hubris is not the useful concept we may think it is. Yes, sometimes it is important to be humble, and perhaps enthusiasts of immortality should just give up on their dreams and accept death, as per Ward's advice. But what if the Wright brothers took Icarus's story to heart and renounced their hubris, thus giving up any hope of aviation? For every single technological prospect in the history of humanity, people such as Ward have issued warnings about its price being too high. I can envision someone during the Copper Age telling whoever invented the wheel that the price for the new artifact is too high because armies would use it to move faster and kill more people.

In *The Price of Immortality*, Ward goes to great lengths explaining the price that is paid in the quest for immortality. As he notes, "The real price of immortality may be the distraction from more pressing issues that could immediately raise the life expectancy of the general population." This is a meaningful idea, until you consider that this has been exactly the same argument used against many successful ambitious technological endeavors. Why send a person to the moon if there are starving children in Africa? I, for one, am glad Neil Armstrong got there. Granted, that has not directly provided food to children in Africa. But it has fulfilled a human ambition that motivates our technological society to keep going, and, at the end of the day, *that* is what feeds starving children.

Admittedly the science to get to the moon was fairly clear, whereas we are mostly in the dark about how to radically extend life to the point of being immortal. This is one of Ward's strong points in the book. He immerses himself in the subculture of immortalists and finds people more akin to science fiction aficionados than real scientists. But I fear that this is because he cherrypicked them, precisely to make immortalists look bad.

It is easy to laugh at Neal Van Reede's assertion to Ward that "I know I'm going to live for five hundred, one thousand, ten thousand years," and likewise it is hard to not raise an eyebrow reading about Ward's descriptions of Aubrey de Grey's eccentricities. One even realizes that many of these immortalists are simply recycling religious fantasies, as in the Church of Perpetual Life. But Ward paints the immortalist movement with too thick a brush. Conspicuously absent from Ward's book is Nick Bostrom, a respected Oxford philosopher who takes the prospect of immortality very seriously.

Be that as it may, Ward is successful in arguing that the prospect of immortality is very remote. Although life expectancy has increased in the past few centuries, it is largely due to the reduction of infant mortality. It seems that the roof for dying age is firmly set, and technology has not been able to push it higher. The oldest person to ever live was Jeanne Calment, who died at 122 years old. But Ward explains that it is likely that "her daughter Yvonne had assumed her identity in an attempt to avoid inheritance taxes," so she may have in fact died much younger. Ward further reports that dishonesty is rampant in the immortalist subculture: "In the vacuum between scientific theory, discovery, and real-world solutions, a familiar crowd of con artists and fraudsters have emerged to take advantage of those seeking never-ending life."

Scientifically, Ward is right on target, as he persuasively argues that immortality is currently very unfeasible. But

I grant that, right now, investing in immortality projects seems more like a fool's errand, but things may change very quickly.

again, similar claims could have easily been made when, say, Leonardo da Vinci sketched the aerial screw. Surely for the fifteenth-century mindset, the idea of the helicopter would have been laughable. So, we must approach this issue philosophically rather than scientifically. And the key philosophical question is: Is it worth it to pursue an immortalist dream that is very remote?

My view is that, *pace* Wade, it may be worth it. A secular version of Pascal's wager is relevant in this regard. Yes, there is a financial price to pay for the quest of immortality, and we may get nothing in return. But if we ever become successful, the reward will be immense. While I grant that, right now, investing in immortality projects seems more like a fool's errand, things may change very quickly. While not exactly exponential, technology's growth rate does warrant some expectation. I do not disapprove of Arthur Clarke's famous law that "Any sufficiently advanced technology is indistinguishable from magic."

Ward makes some other questionable philosophical points. For example, he raises the problem of overpopulation as an argument against the quest for immortality. But he never explains why overpopulation is a problem to begin with. Consider philosopher Derek Parfit's famous "repugnant conclusion" argument: "For any possible population of at least ten billion people, all with a very high quality of life, there must be some much larger imaginable population whose existence, if other things are equal, would be better even though its members have lives that are barely worth living." Parfit's utilitarian reasoning is that even if overpopulation decreases happiness in the average, it increases it in the aggregate, and there is no sound reason we must prefer average above aggregate measures. Parfit reaches the "repugnant conclusion" that there is a moral obligation for populations to keep growing, and despite the repugnancy, he has never been decidedly refuted by philosophers.

Ward also seems to be fixed on the idea of inequality. He makes the apocalyptic argument that "if we continue down the path of untempered inequality, we may as well be dead anyway." How so? Inequality may be bad for many reasons, but it does not kill people; poverty does. And as the historical experience of Communism shows, overzealous attempts to reduce inequality end up producing massive poverty. We may as well be dead if we follow *that* path.

One common argument against immortality repeated by Ward is that it is a rich person's fantasy and would only benefit the elite, further augmenting the divide between classes. Again, history proves otherwise. Most technological innovations eventually trickle down, once they are produced on a massive scale. Raymond Kurzweil may be yet another eccentric, but he did have a point when he once said in an interview: "I don't think it's accurate to say that these technologies are the province only of the wealthy. People say, 'Oh, only the wealthy will have access to these tools.' And I say, yeah, right—like cell phones. You know, five billion people have cell phones. Thirty percent of Africans. Half the farmers in China." I see no reason why if some immortality elixir were ever created, it would be any different from the current distribution of smartphones.

Immortalists need to be challenged, not least by skeptics. While his arguments are sometimes questionable, Ward makes some good points, and the book's journalistic style is sufficiently engaging so as to merit a recommendation. ■

Gabriel Andrade is an assistant professor in the College of Medicine, Ajman University, United Arab Emirates.

A Brief Response to Pigliucci's Column on E.O. Wilson

BERT HÖLLDOBLER

This is a response to Massimo Pigliucci's "The Philosopher's Corner" column, "A Different Take on E.O. Wilson," in this issue, p. 26. The author, a distinguished zoologist and expert on social insects, was a colleague and coauthor of *The Ants* and three other books with Wilson. —Editors.

I do not think it is fair to reduce Richard Dawkins to a "science popularizer." I was not happy when my friend Ed Wilson labeled Richard a "science journalist" whose critique he did not need to take seriously. Ed did not like Dawkins's acid review of his book *Social Conquest of Earth*, in which he tried to convince readers to abandon kin selection theory and convert again to group selection. Dawkins's review was harsh, but I agreed with his critique; Ed knew this.

Richard Dawkins is an extremely gifted writer. He had an Oxford chair for public communication, but he also made several important contributions to behavioral and evolutionary biology. His book *The Extended Phenotype* presented an original new concept for the discussion of operational targets of selection.

I share the concerns Massimo Pigliucci expressed about Ed Wilson's attempts to unify science, especially in Wilson's book *Consilience*. I would also critically mention that in his beautifully written book *On Human Nature*, in some paragraphs, especially when discussing gender inclinations, Ed mirrors his upbringing in the southern United States. I vividly remember our discussion after I had read the manuscript of this book. Many years later, during a dinner in Cambridge, I asked Ed whether he remembers our discussions, and he responded: "You may have had a point."

However, there is almost nothing of this kind of bias in the last chapter of *Sociobiology*. Ed reviewed a wealth (but by far not all) of the data on human ethology, and he presented several hypotheses concerning the sociobiological roots of human behavior. One needs to be endowed with a special distortive imagination to claim this chapter will entice sexism, racism, and genocide, accusations made by the group Science for the People of which Richard Lewontin and Stephen Jay Gould were active members. Yes, Ed was right; those criticizing him had no interest in the subject. I know from my own experience that these prominent evolutionary biologists—and especially the philosophers of science Pigliucci seems to refer to—indeed did not know much about the subject; certainly, neither Gould nor Lewontin did.

I also take issue with the sweeping statement "several other notorious racists, such as Arthur Jensen and Richard J. Herrnstein." I did not know Jensen, but levelheaded, undogmatic psychologists told me he was a highly respected scientist who was convinced of the data he gathered by testing methods he developed and refined, and he made many suggestions about how to improve teaching and mental development. Apparently, some of his results were later considered politically incorrect. In fact, in retrospect, some of the tests and conclusions needed revision. But this does not make him a racist. Ed may have exchanged letters with Jensen. I do not know anything about that.

I did know Herrnstein. He was an excellent cognitive comparative psychologist whose pioneering work on referential cognition in pigeons was outstanding and is still relevant in the field of animal cognition. He was a student of B.F. Skinner and followed on his chair at Harvard University. Among psychologists, he is most famous for his elaboration of the so-called matching law and the development of mathematical psychology. Probably in the mid-1970s, Herrnstein also became interested in human intelligence. I do not think it is fair and appropriate to compare his work and achievements with that of Rushton.

Of course, Ed corresponded and spoke with Herrnstein, as did I. In fact, for a certain time period, my behavioral biology group and Herrnstein's group regularly met in discussion seminars. I remember that IQ tests were considered appropriate measurements of some kind of human intelligence, and several groups independently found differences among geographic or socioeconomic groups. But at that time, experts were already discussing that these IQ tests only measure certain abilities and do not capture the whole spectrum of mental abilities. Nevertheless, Herrnstein paid special attention to so-called intrinsic factors determining human nature first exemplified in the book by J.Q. Wilson and R.J. Herrnstein *Crime and Human Nature* (1985) and later in the book *Bell Curve* by R.J. Herrnstein and C. Murray (1994). This latter book appeared on the market after Herrnstein had passed away. Both books received negative but also positive reviews. Today, we probably would say, yes, there are innate factors, to deny them will not help, but to recognize and develop educational counter strategies would be desirable. Though I do not want to defend Herrnstein's later, somewhat pessimistic views—and in hindsight some of their conclusions are totally unacceptable to most of us today—I would never call him a racist. We are currently very quick

in labeling people as racists, and, I am afraid, we will allow the real racists to escape. To blame Wilson because he had corresponded with Herrnstein is ridiculous! Fortunately, not all evolutionary biologists and philosophers of science jumped to such ignorant conclusions.

Pigliucci quotes Farina and Gibbons, the *Science for the People* magazine authors, without checking the facts himself. In this case, such fact-checking should be demanded. For example, did he check the "highly questionable paper by Rushton," which Wilson sponsored for *Proceedings of the National Academy of Sciences*? To my knowledge, it was the paper by J.P. Rushton, C.H. Littlefield, and C.J. Lumsden, "Gene-Culture Coevolution of Complex Social Behavior: Human Altruism and Mate Choice," *PNAS*, 83,7340–7343, 1986. One might disagree with the concept of gene-culture co-evolution, but I do not think this paper is so outrageously controversial. What might have been Ed's motivation to sponsor this paper? Most likely he wanted to promote his former postdoc Charles Lumsden, with whom he had written the book *Genes, Mind and Culture*. Here again we have a case that writers pick up second- or third-hand information and construct a story that borders on character assassination. This is as I see the entire campaign against Ed after he passed away.

I recommend Massimo Pigliucci consult the blog of Jerry Coyne again. Coyne followed up and carefully analyzed new writings. He presented essential pieces from the excellent analysis by Michael Shermer of the Rushton-Wilson correspondence. Shermer demonstrated that the four historians of science—the two authors for the article in *Science for the People* and the two of the essays in *New York Review of Books*—were very eagerly cherry picking to imply that Ed Wilson is a racist. They never asked the question (as good historians of science should do): Why did Ed Wilson write letters in support of Rushton? Shermer's article clearly proves what I assumed and expressed in my online article "Self-Righteous Vigilantism in Science: The Case of Edward O. Wilson."

Finally, I need to make one more remark: Saying Ed's science was affected by ideology and praising Gould and Lewontin as pure, ideology-free scholars is just total rubbish. Yes, Lewontin was a brilliant scientist and could have become the real successor of geneticist Theodosius Dobzhansky. But, as he admitted himself, he was a deeply committed Marxist, and this had priority over his science. I liked Lewontin, and we had a good collegial relationship. Gould was a pompous, arrogant fellow. In his younger years, he promised to develop into an outstanding scientist, but his success as a popular writer carried him away. His Marxism was, as I also labeled Lewontin's Marxism, sand-box Marxism, far removed from Marxism in the real world. ■

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Melanie Trecek-King
A Life Preserver for Staying Afloat in a Sea of Misinformation

Timothy Caulfield
Infodemic: How the Hell Did It Get This Bad?

Rep. Sean Casten
FERC and FERCalicious: "The Most Important Organization You've Never Heard Of"

E.O. Wilson

Thank you very much for your fine article on E.O. Wilson in the May/June 2022 issue of SI. I think you did a wonderful job of highlighting his achievements and addressing the controversy surrounding some of them in a fair and even manner. I never met Wilson myself, but his thoughts on evolutionary science have strongly informed my own perspectives in many respects for several decades. He was a great scientist whose work will live on.

Matthew Sharps
Professor of Psychology
California State University, Fresno

That large trove of fond tributes to E.O. Wilson were both impressive and poignant. But let me weigh in and play a mildly iconoclastic role that I think he'd respect: a picky editor. Sean Carroll includes a quotation from Wilson's afterward to his *Naturalist*, where Wilson waxes eloquent in his praise for the "astonishing depths of wonders in the universe." He assures us that those marvels are "continuously revealed." Now, it'd be nice to think that, at every second of every minute of every day, the universe is revealing itself. A man with Wilson's inexhaustible enthusiasm may have *felt* that his world was *always* revealing its fascinating processes. But the truth, to this skeptical and rather pedantic reader, is more pedestrian, more reasonable—it *keeps showing* those glories, now and again, from time to time. It does not do so at every instant. So, my nutshell comment: What Professor Wilson meant, more precisely, was that our universe's wonders are being *continually* shown to us, not *continuously.*

Jamie Spencer
St. Louis, Missouri

"Cosmic Evolution: An Epic Poem" (after E.O. Wilson's vision of "Consilience")
Stars. Plants. Words.

David A. Snodgrass
Gilbert, Arizona

Mr. Frazier states Wilson's "father moved Wilson and his sister," but Wikipedia and Sean B. Carroll (eminently reliable, because he writes that his favorite Wilson work is Wilson's autobiography) both state that Wilson was an only child. No sister.

Linda Ferrazzara
Randolph, Massachusetts

Kendrick Frazier responds:

That was my mistake. Wilson was indeed an only child. On page 56 of Naturalist*, Wilson wrote "my father moved Pearl and me to Washington, D.C." But Pearl was Wilson's stepmother, not sister.*

Mathematics and Evolution

Jason Rosenhouse nicely illustrates the absurdity of mathematical arguments against evolution ("The Failures of Mathematical Anti-Evolutionism," May/June 2022). But it isn't really necessary: evolution is conclusively demonstrated by facts on the ground, so any argument against is necessarily wrong.

The theory of evolution is provably correct. The proof can be stated in fourteen words:

- Heritable mutations occur with every reproduction (which is why no two people who have ever lived are identical).
- Some mutations are beneficial for survival and reproduction (which should be obvious).

These two premises constitute the entirety of the theory of evolution. Both are existential statements that are demonstrably true, so the theory of evolution is necessarily true also.

Some have claimed that there are limits to evolution. Not only has no one proposed (let alone demonstrated) a credible mechanism for such a limit, it has been conclusively demonstrated by Theobald that everything that has ever lived on this planet is descended from one primordial organism that lived about four billion years ago (see http://doi.org/10.1038/nature09014 and http://talkorigins.org/faqs/comdesc).

Evolution is a fact. For details, see Robert A. Saunders, *What Can We Know, and How Can We Know That We Know It?*, Chapter 6.

Robert A. Saunders
Rohnert Park, California

Mass Psychogenic Illness

In January 2022, I swerved into your magazine at a national chain bookstore and purchased a copy. I quickly became a year-long subscriber; I am really enjoying going through the electronic back issues and really appreciate the "bang for the buck": for less than twenty dollars I have access to thousands of articles.

I found Stuart Vyse's column, "Mass Psychogenic Illness: The Unacceptable Diagnosis," May/June 2022 really interesting. On page 27, it is related that the *Journal of the American Medical Association* (*JAMA*) published two MRI studies of U.S. embassy personnel who suffered symptoms attributed to Havana Syndrome. But Baloh and Bartholomew (2021) severely criticized these articles for, among other things, bias and unjustified conclusions. How could these two studies pass muster to even be published in the *JAMA*? It makes me think less of their publication that they would allow the publication of studies exhibiting such poor methods.

Thank you for your magazine and back issues!

Norm Erickson
DeBary, Florida

Aristotle's *Rhetoric*

I appreciated Massimo Pigliucci's reminder of the merits of Aristotle's approach to rhetoric ("On Pigeon Chess and Debating," May/June 2022).

Thankfully, his colleagues in speech communication/communication studies continue to train students in the merits of the *artistic proofs*, which he refers to as "the rhetorical triangle." My preference is to use the former terms of art, as they locate rhetoric squarely within the artistic, not scientific, realms of human inquiry. As such, their use requires a fair bit of humility when engaging with interested and opposed interlocutors. While *ad hominem* attacks will positively arouse those already in your camp, they can also backfire when seeking to convert those on the fence about your side. In short order, a jaunty use of pathos can come to seem merely *pathetic*.

One slight addendum to Pigliucci's discussion: his discussion of *logos* includes, at least when referencing evidence, an implied nod to those aspects of rhetoric that are not created by the speaker; that is to say, the *inartistic proofs*, which are the examples and such that a speaker brings into their rhetorical creation.

My hope is more people reference Aristotle's *Rhetoric*, no less his complementary discussions in *Ethics*.

Mark Porrovecchio
Assoc. Prof. of Rhetoric
Oregon State University
Corvallis, Oregon

I enjoyed the column "On Pigeon Chess and Debating" and feel it could be usefully reconfigured for other, not dissimilar,

uses, such as debating deep state conspiracy theories concerned with a global takeover by a hidden one-world government cabal.

Thomas Whitehead
Klamath Falls, Oregon

Fabulous Land of Punt

Massimo Polidoro's column "The Fabulous Land of Punt" (May/June 2022) reminded me of a similar article in *Scientific American*, "Secrets of the Sacred Baboons" (November 2021). Baboons are not native to Egypt, but the ancient Egyptians apparently imported and worshipped hamadryas baboons thought to have come from Punt. These baboons are in the habit of sitting upright and letting themselves be warmed by the rising sun (Ra to the Egyptians). Chemical analysis of some baboon mummies indicated they probably came from south of Egypt near the horn of Africa or southwestern Arabia. Interestingly, the Somalia state of Puntland was named after the ancient Egyptian Land of Punt.

Frank M. Archer
Delta, British Columbia
Canada

As Massimo Polidoro writes in "The Fabulous Land of Punt," there has been much argument over its location.

Citing the information provided by images and inscriptions on the walls of Hatshepsut's temple at Deir al-Bahri, he writes that "Punt must have been located south of Egypt, in an area between today's Eritrea and Somalia, because only in that area was it possible to find goods carried by the ships."

That may well not have been the case 3,500 years ago, when Hatshepsut lived. Climatic conditions have changed. Desertification has expanded southwards from the core areas of the Sahara. One indication of what has occurred is the multiple representations of elephants and lions at a 2,300-year-old temple at Musawwarat al-Sufra, Sudan, located around fifteen miles from the Nile, between the Atbara and Blue Nile. This suggests a savannah landscape rather than a more arid one.

Egypt could only trade directly with Punt through the Red Sea, but it also received some Puntite products indirectly over land. This factor, taken in conjunction with allowance for the impact of climate change, would make the Eritrea-Sudan-Ethiopia border area a more probable location for Punt than the Somali borderlands.

John Gee
Singapore, Republic of Singapore

Bigfoot Duplicity

Thank you for the latest episode in the Bigfoot saga ("Duplicating Bigfoot Duplicity," May/June 2022). Here is an anecdote you might find amusing.

As you know, the big guy's name was coined by Andrew Genzoli of the *Humboldt Times* in Eureka, California. I was Andy's assistant when Jerry Crew brought in the [original Bigfoot] plaster casts. Andy dumped his regular work on me while he did the story that took up much of the front page of the Sunday *Times* and set off the Bigfoot craze. As I was working in the next room, the usually very opinionated and talkative L.W. "Scoop" Beal, editor of the afternoon *Humboldt Standard* came in, sat down by my desk, and just watched the activity with Andy, Jerry, and other *Times* staff.

It should have been a tipoff. Years later, we learned that Scoop had been in on the hoax, along with others—perhaps even Andy. After the Sunday article appeared, we were inundated with letters, calls, and self-published booklets about Bigfoot-type and other creatures. There was so much that we could not answer it all, so we just threw it into a big cardboard box. When somebody came in asking for information, we referred them to the box. I do not know what happened to that box, but it probably should have been bronzed as the birthplace of much of the Bigfoot stuff that soon appeared.

Ray Oliver
Citrus Heights, California

'Breaking News!'

I enjoyed Bryan Farha's perspective on the current abuse of the phrase "Breaking News" (Forum, "Breaking News, My Foot! How Cable TV Has Changed the Standard," May/June 2022). The old school usage is certainly more valid than the current usage of putting a striking colorful "Breaking News" banner in front of everything. Perhaps there is a need for an updated fable about a reporter who constantly cried "Breaking News!" and who is then ignored when something really is taking place.

The article reminded me of "an unknown suspect," a phrase that started appearing in media some time ago. If someone is a suspect, doesn't that imply that they are known? Or conversely, if someone is not known, how can they be a suspect? Perhaps we are all suspects.

Bill Grasha
Madison Heights, Michigan

Martian Dreams

Thank you to Matthew J. Sharps and his collaborators for their article about the connection between schizotypy and "space beliefs" ("Martian Dreams: 'Unusual Experiences' and Perspectives on Space and Aliens," March/April 2022).

Tangentially, maybe some of the people who want to go to Mars whether or not they can return to Earth don't particularly want to meet fabled space aliens and might not be disappointed by their new world. Maybe they don't want to look for Martians. As Ray Bradbury so beautifully wrote, maybe they want to be the Martians. We still have that in us.

Bill Barley
Asheville, North Carolina

Joe Rogan Show

The progressive left labeling any speech that goes against their liberal narrative as "racist, sexist, Islamophobic or transphobic" is exactly why Joe Rogan's show has become so popular ("Questioning Joe Rogan," May/June 2022). If you listen to what many conservative speakers say, it isn't any of those things. But rather than debate their points, the progressive left has taken to labeling them as "hate speech" and getting them banned from most social platforms and college campuses instead. The progressive left needs to learn that if they continue to stifle dissenting opinions by declaring them hate rather than debating them, shows like Rogan's will only continue to grow in popularity.

Jeff Bengtson
Belmont, Michigan

Contrasting Letters

It was interesting to see the contrasting letters to the editor from Dr. Reisner and Ms. Sharp on Debra Soh's book *The End of Gender* (May/June 2022). Ms. Sharp entirely misrepresented Dr. Soh's stated positions on conversion therapy, transgender identity, and LGBTQ rights. While Ms. Sharp has apparently heard some bad things about Dr. Soh, it is equally apparent that, unlike Dr. Reisner, she has not read the book.

Peter Wyble
Chicago, Illinois

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